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American Antiquity

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AMERICAN ANTIQUITY

VOL. IX OCTOBER, 1943 NO. 2

EDITORIAL

THE SOCIETY for American Archaeology is indeed fortunate for it is composed of a body of archaeologists who are willing to support it enthusiastically during these difficult times. The raise in dues, voted by the Executive Committee, has been received by a large majority of the membership not only without complaint but actually with unqualified approval. In addition to this those members who were in a position to do so have contributed liberally to the Working Fund. This approval and additional support should have been recognized by letters to the membership but I have not done this because such would be an expensive procedure. I hope that each and every one of you will accept this note as a recognition of your interest, loyalty and generosity.

Dues from all members have not been received at the time of this writing but if the present rate of returns continues it is possible that the Society will not need to curtail unduly its activities during the current fiscal year. It must be recognized, however, that the Society is facing a difficult period. An increasing number of people are entering the Armed Services and the war industries and this results in a lowering of the size of the membership and consequently the income. Furthermore increasing publishing costs are an additional burden on the treasury. In order to offset this the Society needs the continued support of the membership. In addition to dues we need new members. All members are requested to invite their friends and associates to join the Society.

The Editor is having his problems. Various orders from the War Production Board limiting the paper supply have been received. As a consequence a lighter, but good grade, paper is being used in this volume. By doing this it will be possible to continue publishing AMERICAN ANTIQUITY in its usual form and size.

We are trying to cooperate with orders intended to aid in the prosecution of the War. At the same time we believe that the Society and AMERICAN ANTIQUITY are a significant part of the scientific life of the country and that every effort should be made to assure that this is kept in a healthy state so that we will emerge from the War and the period of reconstruction with a solidly built foundation upon which we can build for the future.

FREDERICK JOHNSON
Treasurer

CONTRIBUTION TO MONTANA ARCHAEOLOGY

N. C. NELSON

THE summer of 1941 saw the American Museum in possession of a permit to excavate two caves on the Crow Indian Reservation in south-central Montana. Those caves were selected from other possibilities the year before by my colleague, Junius Bird; but, owing to his absence, the permit, originally issued to him, was changed in my favor. August and September were chosen as the most favorable time, and five weeks were devoted to actual field operations.[1]

The results obtained, while in a sense new, were on the whole disappointing and scarcely worthy of extended treatment. Besides, under present conditions the publication of a full report might be long delayed. In the meanwhile a concise detailed report has been prepared in triplicate for the Department of the Interior, as required; but something less must here suffice. Also it is in order to mention that intensive archaeological work, partly under W.P.A. auspices, has been going on in the same general region of Montana for four years, on the results of which Mr. William Mulloy, a University of Chicago Ph.D. candidate, has in preparation several reports of basic importance. Under these circumstances the present investigation can offer little more than a contribution to the subject and it seems therefore best to record here and now only the main essentials in brief form.

SAGE CANYON CAVES

The two caves for which permits were held are located, with others, in what I venture to call Sage Canyon, about forty miles due south of Billings and reached from that city by either the Pryor Valley road or Laurel-Bridger-and-Bowler road. The two approaches meet shortly inside the southwest extremity of the Crow Reservation, off the north-

[1] Another two weeks were given to visiting local sites, museums, and private collections. These included a brief inspection of the Pictograph and Ghost caves recently excavated near Billings as well as a bison drive dump now being worked on the outskirts of the city. At the museums in Billings, Helena and Missoula small Montana collections of uncertain origin were seen. More important were the several private collections examined, including that of Mr. Oscar Lewis, in charge of the local W.P.A. excavations; but although some of these collections came partly from localities later personally worked, only items not found in my own series are here considered. Finally I reexamined Barnum Brown's unique collection of arrowpoints found in two bison drive dumps near Emigrant and by him described in *Natural History* for 1932, pp. 75-82. The main conclusion derived from all this is that, as would be expected, Montana yields at least some indications of Folsom and Yuma points. More surprising is the presence of oblong manos, rectangular metates and grooved axes. Incidentally, I was told that pottery ranges well into the northwestern part of the state, and that bison drives are very numerous.

west corner of the Custer National Forest, and near the lower end of the canyon, up which the joint road proceeds in an east-southeast direction towards the Shriver post office.

This ancient box-like gorge is cut into the Madison limestone formation composing the western foothills of the Pryor Mountains. It is about four miles long, from 150 to over 600 yards wide, and flanked on either side by more or less vertical escarpments rising from about fifty feet at the lower end to over 200 feet at the upper end where the canyon fades out into U-shaped valleys. The somewhat narrower and more nearly level and smooth alluvium canyon floor is for the most part separated from the cliffs by talus slopes which rise in places to nearly 150 feet. Sage Creek, a permanent stream, meanders down the middle of the canyon floor and is lined with a thicket of willow, birch and chokecherry growths. Sagebrush and yucca cover the talus slopes and the hill country above is sparsely dotted with stunted pines and spruces. The general elevation is about 5000 feet.

Of caves and shelters, apparently for the most part of mechanical origin, no less than thirty-five were counted in the north escarpment, facing the sun, while only ten were observed on the south side. At the lower end of the canyon these uniformly wide open cavities were situated at the level of the valley floor, while elsewhere they were all, with the exception of a single rockshelter, above the talus. Allowing for wide variation in size, the caves and their general setting seemed well adapted for aboriginal occupation, the only deterrent being perhaps the relatively short summer season.

As proof that the canyon had been visited there were observed, near the upper end, several indications of lodge sites, marked by circles of boulders ranging in diameter from fifteen to eighteen feet. Scattered over a much wider area of the canyon floor, but here and there obscured by a heavy grass cover, there were found also a considerable sprinkling of stone artifacts, doubtless much reduced by local collectors. Lastly, three of the adjacent upper end caves exhibited painted pictographs.

For purposes of plotting and excavation, the generally level and unobstructed cave floors were staked off in meter squares. Each square was excavated separately and the artifact results sacked up and labeled accordingly. It was the intention to strip the floor by cuts twenty-five centimeters deep; but as nothing was found below the natural floor surface, the cut was generally taken to a depth averaging thirty-five centimeters. Afterwards, a test trench one meter or more deep was dug from front to rear about midway in the caves, occasionally reaching bed rock, thus to make certain that no earlier culture strata were present. All material from the surface strippings and occasional samples from the test trenches was sifted through a quarter-inch screen.

Cave I. The first cave to be cleared was a two-chambered gallery, connected by an inner passage. It is located near the upper end of the canyon just above the bridge. Situated on the north side of the canyon at the base of the topmost escarpment, nearly 100 feet above the creek, it faces southwest and affords a fine view of the forested mountains a mile and more away. The right hand chamber measures about ten meters from side to side and fourteen meters from front to rear with a ceiling height of about three meters. On the rear wall there is a well preserved figure of a bison, two feet long, painted in solid black. The left hand chamber, not all suitable for excavation, measures fourteen meters across and fifteen meters in depth with a front ceiling height of four meters. Both galleries have in addition minor alcoves or recessed shelvings on the sides and rear, each with more or less of rats' nest material, including animal bones.

The combined excavations covered fully 170 square meters but the results yielded only four small fireplaces, one bone awl, one bone pendant, two worked bones, two fragmentary chipped knives or spearpoints, sixty-three reject cores and flakes, 1167 fragmentary animal bones and one glass bead. All these items were found beneath the cattle dung, directly on the natural cave earth floor.

Cave II. The second and rather conspicuous cave covered by the permit is located also in the north escarpment about a mile below the bridge. It faces west and is situated about 500 yards from the creek, at the top of a wide talus slope rising nearly 150 feet, and at the base of the here single vertical escarpment. It is fourteen meters wide and twelve meters deep—exclusive of rear and lateral alcoves, and the ceiling height in front is fully six meters. The main floor was covered with cattle dung reaching a depth of as much as fifty centimeters. On the rear wall is a single, partly scaled-off, red, painted pictograph in the form of parallel vertical and horizontal lines crossing each other.

The excavations here, in addition to trenchings of the four alcoves and searchings of the rats' nests, covered fully 150 square meters. As before, the artifacts all lay beneath the dung on the surface of the natural floor. In all there were found only traces of two fireplaces, five arrowpoints, three end-scrapers, seven knife blades or spearpoints, 161 reject cores and flakes and about 450 fragmentary animal bones, most of them from the rats' nests.

Trial excavations. The results from the two caves having been so largely negative, especially in view of the comparative wealth of stone artifacts found on the canyon floor, it seemed best to take the liberty of trying out some additional caves and shelters, both high up and low down, with the idea—if they proved richer—of later asking permission to excavate them. Accordingly, examination was made of at least

twenty-five possible habitation sites, fifteen on the north and ten on the south side, distributed over the entire length of the canyon, but with one exception located near the two extremities. All but one of the twenty or more sites inspected at the upper end were situated above the talus while the four at the lower end were down close to the canyon floor. Twenty of the twenty-five sites were small; of these only three showed faint indications of occupation. The remaining four caves and one rock-shelter were somewhat larger and in part merit special notice.

Cave III. This site is located on the south side, about one-quarter mile below the bridge, the situation being above the talus at the head of a rincon. The cave is about thirty meters wide and as much as six meters deep and faces east-northeast. On its rear wall there are, besides some undecipherable glyphs, at least six human figures faintly outlined in black, as if done with a charred stick. A twelve-meter trench dug along the right hand front edge yielded a number of the usual artifact items, but hardly in sufficient quantity to warrant complete excavation.

Cave IV. Located on the north side, nearly two miles below the bridge, this cave is situated above the talus. It is seven meters wide and eight meters long, plus a ledge extension. Here a median six-meter trench was dug with similarly negligible results.

Cave V. The last cave to be tried, and ultimately cleaned out, is located on the north side at the lower end of the canyon, and is situated down near the canyon floor level, facing southwest. It is an arched chamber two and one-half meters high, with a floor space measuring only two by three meters. The entire floor deposit, averaging about sixty centimeters in thickness, was screened, and the yield from it exceeded the combined results of all the other caves.

Rockshelter I is located at the upper end of the canyon about seventy-five yards to the east of Cave I, but situated at the canyon floor level. It is a long shelter two meters wide, the left end of which showed signs of occupation. Here a shallow ten-meter trench was dug with good results similar to those from Cave V.

PRYOR CANYON AND VALLEY

On invitation from Robert Yellowtail, Superintendent of the Crow Agency, a week was devoted to trial excavations in and near Pryor Canyon, about ten miles north of Sage Canyon. This narrower and more nearly V-shaped gorge is also cut into limestone and heads southeast. It is drained by a considerable stream and shows a somewhat different vegetation, cottonwoods, box elders and buckthorns being present, with wild plums only a short distance below. Only the lower end of the canyon was explored and here in the east escarpment several possibilities were examined; one large cave, low-down, and two small caves, high-up

were tried out, almost without artifact results. Nevertheless, these caves have been visited as is indicated by red and black painted pictographs in the form of horizontal bands of short vertical strokes, crosses, trident-like emblems, and possibly stylized human and turtle figures.

Immediately below the mouth of the canyon, on the Pryor Valley floor proper, there is to be seen a series of artificial stone heaps or cairns, the function of which is problematic. Circumstances did not permit a detailed survey but most of those between the road and the creek appeared to lie in a straight row while two, at least, lay outside, near the road. The upper and larger of these two, twelve meters in diameter and 150 centimeters in height, lies west of the creek, situated at the base of a steep promontory cliff known as Arrow Rock. It was reported to contain artifacts. To make certain of this a trench two meters wide was cut fully halfway through the mixed earth and boulder deposit. The results proved that at least the upper half of the accumulation was moderately rich in the usual stone objects, glass beads and animal bones. More abundant were bone and shell ornamental items, chiefly beads and pendants. The surprise was the collection of some 200 potsherds. Why these things were present in the cairn is difficult to say, but presumably they must have been left as offerings.

OPEN AIR CAMP SITE

The last site to be mentioned lay outside the Reservation, near the Bridger-Bowler road, by a small spring in a hollow of the hill country a short distance northwest of Bowler. It was examined only in passing but the few artifacts gathered from the surface agree, as far as they go, with what was found elsewhere.

INVENTORY OF ARTIFACTS

In order to make clear precisely what was found in the ten major sites excavated or sampled the following tabulations must serve. By way of preliminary explanation it should be stated that all potsherds, paint particles and nearly all worked bone items were found in the stone cairn. Also, be it noted, the first figure following the description gives range of occurrence, while the last figure, in parenthesis, designates fragmentary specimens. Classified and enumerated the combined results obtained are as follows:

I Flaked and Chipped Stone Weapons, Tools and Rejects:			
1. Arrowpoints of 11 different forms (see remarks below)	9 sites	26	(50)
2. Drillpoints of expanded base type, plus and minus side notches	3 "	2	(1)
3. Endscrapers: sub-triangular, sub-rectangular, oval and keelshaped	6 "	31	(9)
4. Knives or oblong flakes more or less chipped on one face only	5 "	7	(1)

	5. Knives or spearpoints; biface blades with straight or convex base, 2 stemmed	7 "	5	(48)
	6. Sidescrapers: spalls with concave or convex chipped edge, thick back	4 "	17	
	7. Rejects: 8 blanks, 76 cores, 3460 angular flakes	10 "	3544	
II	Ground Stone Implements etc.:			
	1. Arrowshaft straightener, grooved, of sandstone	1 site		(1)
	2. Bar amulet, plano-convex section of hematite	1 "		(1)
	3. Hammerstones of bowlders and pebbles	2 "	1	(1)
	4. Upper mealing stones or rubbing stones, flat, oval	2 "		(2)
	5. Lower mealing stones or metates, of sandstone	2 "		(2)
	6. Maul, grooved, of granitic rock	1 "		(1)
	7. Tanning stone, or flat oval bowlder with ground flat edge	1 "		(1)
III	Bone Implements etc.:			
	1. Awls of split mammal bones (2 in private coll.)	2 sites	3	
	2. Pointed implement of antler, smooth point but doubtful	1 "	1	
	3. Worked bones of unidentifiable function	5 "		(8)
	4. Animal bones, mostly of unidentifiable mammals	9 "		+(2692)
IV	Ornamental and Game Objects of Stone:			
	1. Beads of steatite, disk type (in private coll.)	1 site	2	
	2. Pendant of pale turquoise, subrectangular tablet	1 "		(1)
	3. Dice or game pieces of alabaster, round and oval, incised	1 "	2	
	4. Red and white paint particles (some prob. iron oxide)	1 "		(30)
V	Ornamental Objects of Shell:			
	1. Beads: 6 disk forms, 3 short tubular	1 site	9	
	2. Beads of whole and fragmentary *dentalium* shells	1 "	5	
	3. Pendants of clam shell pieces	2 "	1	(2)
	4. Pendant of conch (?) shell stem, grooved and pierced	1 "	1	
	5. Pendant of lip-pierced univalve (periwinkle?) shell	1 "	1	
	6. Pendants of tip-pierced local snail shells, stained red	1 "	12	
VI	Ornamental Objects of Mammal and Bird Bones:			
	1. Beads of round disk type, small	2 sites	3	
	2. Beads of subspherical type, small	1 "	9	
	3. Beads of tubular type, ¼ to 4 cm. long	1 "	68	
	4. Beads of tubular type, with transverse grooves	1 "	5	
	5. Beads of pierced fish vertebrae	1 "	2	
	6. Beads of pierced snake vertebrae (in private coll.)	1 "	14	
	7. Pendant of pierced phalangeal mammal bone	1 "	1	
	8. Pendants of pierced elk tooth and imitation elk tooth	1 "	2	
VII	Potsherds (see remarks below):			
	1. Plain surfaced	1 site		(128)
	2. Corduroy surfaced	1 "		(67)
	3. Textile impressions (?)	1 "		(2)
VIII	Items of Foreign Origin:			
	1. Arrowpoint of iron, stemmed and shouldered	1 site	1	

2. Arrowpoint of copper, lozenge-shaped	1	"	1	
3. Pendants or jingles of copper plate, conical and cylindrical	2	"	2	
4. Beads of blue and green glass; tubular, subspherical	4	"	3	(1)
5. Bead of white porcelain, subspherical	1	"		(1)
6. Misc. items of recent origin, including one bronze Lincoln election medalette, dated 1863	1	"	1	

The arrowpoints, found at nine sites, besides being relatively numerous and varied in form, are in part of special chronologic importance and therefore deserving of detailed notice. Nearly all are small. Most of them are well made of chert, chalcedony, agate and obsidian. The eleven distinguishable forms include both the stemmed and stemless types. The latter is represented by the following six forms: straight base (triangular), convex base, concave base, straight base with side notches, concave base with side notches, and straight base with side notches and basal notch. The somewhat larger stemmed type includes five forms, viz.: parallel-sided stem with horizontal barbs, contracting stem with receding (shouldered) barbs, contracting stem with horizontal barbs, contracting stem with downward projecting barbs, and contracting stem with horizontal barbs and basal notch. Those of particular interest for present purposes are the small stemless forms with side notches and especially the ones with both side notches and basal notch. These two forms occur also in the extensively excavated Pictograph Cave near Billings where, in a sixty-foot deposit, they are found only near the surface, closely associated with potsherds and perishable wooden objects. The warrantable inference is therefore that our own essentially surface finds are at least for the most part of relatively late date, though apparently not of Crow origin.

The potsherds found in the Arrow Rock cairn appear to represent culinary vessels of both bowl and jar forms, some with charred food particles adhering to the inside. Surface colors range from buff to gray with indications of a whitish slip on a few pieces. Body thickness ranges from three to nine millimeters and rim thickness from nine to fourteen millimeters. The paste, mostly of pure clay, is sometimes tempered with coarse quartz particles. Firing is well done. The corduroy surfaced ware is difficult to explain. It appears to have been done with a paddle loosely wrapped with a narrow splint (strip of yucca leaf?) creating grooves and raised interspaces respectively about two and three millimeters wide. These roughly parallel impressions, near to rim, have been applied vertically but elsewhere horizontally. The rim pieces present are all more or less thickened at the top. Two of the lips are rounded, the rest flat topped. Three of the latter have both angles or corners of the lip dented at directly opposite points, as if done with a compass-like device, the lower working ends of which were transversely grooved.

CONCLUSIONS

Briefly stated the investigations in the Sage and Pryor Creek canyons appear to warrant the following conclusions:

1. The run of specimens in the Sage Canyon sites shows clearly that the canyon floor and the conveniently low-lying caves and shelters were preferred to the more commodious higher caves, the climb to which we found for ourselves took both time and effort.

2. The culture debris, whether in caves or outside, although varying in thickness, in no instance attained any really appreciable depth. From this, one may perhaps infer that the locality was visited for only brief periods during the short summer season, even though the presence of numerous reject flints seems to argue against this.

3. The recovered artifact remains, limited—except for one open air site—almost entirely to stone implements, are largely of the same character, suggesting that they were left by the same people at about the same period of time.

4. The approximate time period indicated by the available artifacts is *late prehistoric*. This conclusion rests upon at least five facts, as follows: (1) absence of both the Folsom and Yuma techniques, (2) presence of objects of white man's origin, (3) presence of only nonfossilized animal bones, obviously representing living species, (4) superficial occurrence of all finds, and (5) the presence almost everywhere of arrowpoint forms definitely known to be of late date.

5. The culture represented cannot at present be credited to any particular Indian stock or tribe, as for instance the former Shoshoni or the present Crow occupants of the region. The late Crow Chief, Plenty Coups, has stated to his biographer, F. B. Linderman, that his people during his youth (ca. 1860) once camped for a brief period on Sage Creek; but present opinion as expressed by both the Crows and their white neighbors is that they never occupied the caves. The same author also records the tradition that the Crows since early historic times, in common with other Plains tribes, did not make flint arrowpoints but instead used bone points.

6. Finally, the opinion may be ventured that while several of the traits enjoy continental distribution and others, like *dentalium* and *olivella* shells, suggest connection with the Pacific Coast, some few, as for instance the small side-notched arrowpoints (here used for bison hunting), appear to be typical only of the Rocky Mountain region, with extensions into the Plains, the Plateau and the Columbia Valley.

American Museum of Natural History
January, 1942

A PREHISTORIC CAMPSITE NEAR RED LODGE, MONTANA

WILLIAM MULLOY

DURING parts of the seasons of 1937 and 1938, parties from the Montana Archaeological Survey[1] excavated at a campsite exposed by one of the many cave-ins in abandoned tunnels of the Red Lodge Coal Mines, near Red Lodge, Montana.[2] The first season's work was under the direction of the late H. Melville Sayre, then Director of the Survey, while Raymond Thompson was leader of the 1938 party. Laboratory analysis and interpretation were completed by the writer, who is indebted to Paul Reiter, of the University of New Mexico for critical comment.

The area immediately east of Red Lodge is drained by two intermittent streams originating in the Bear Tooth Mountains to the southwest. Bear Creek runs to the northeast and Spring Creek to the north, to the Clark's Fork of the Yellowstone. In the past, Spring Creek drained a much larger portion of this area, only to have its headwaters stolen by Bear Creek which thereafter eroded a small channel much deeper than Spring Creek.

The site is located in a little foothill meadow on Spring Creek, just below the point of piracy, in a rather level area surrounded by low rolling hills. Water, principally from springs, seems to have been confined here in the past in a limited swamp. At the time of excavation the area was quite dry, probably as the result of drainage through the caved-in tunnels. In one of these cave-ins, Mr. Jalmar Salo, of Red Lodge, found artifacts which he reported to the Montana Archaeological Survey. Profiles, exposed by collapsing tunnels, indicate a surface stratum in this immediate locality composed of homogeneous black, sticky soil containing some clay and organic matter. The artifacts, associated with stone chips, animal bones, and charcoal, occurred throughout the black stratum but were concentrated chiefly in the lower portion. Apparently the result of swamp accumulation, this stratum, which occurs only in the bottom of the meadow, varies in thickness between twenty and thirty-six inches and is superimposed on boulders and yellow Fort Union clay. The boulders consists of porphyries, granites, basalts, and other igneous rocks probably derived from the Bear Tooth Mountains through action of ice and torrents. They occur infrequently in the black soil, and are unevenly distributed or entirely absent beneath it.

[1] The Montana Archaeological Survey is a Research Project of the Work Projects Administration of Montana, sponsored by Montana State University (O.P. 165-1-91-139, WP. 3450).

[2] The campsite lies in the NE ¼ of Sec. 23, T7S, R20E, two miles east of Red Lodge.

The early excavations were a series of trenches radiating in several directions from the depression caused by the mine cave. A stratigraphic control of eight inches was observed, but material without special association was not recorded horizontally. At the beginning of the second field season, a grid was laid out and material recorded horizontally as well as stratigraphically. In portions of the area the soil was soft and sticky while elsewhere it was dry and hard.

With the exception of two fire beds, there were no major features. One of these, which occurred in the black soil stratum from eight to sixteen inches below the surface was ovoid in shape, measuring about five by three and one-half feet. It was entirely covered by sandstone slabs, reddened and cracked by heat and coated, on the under side, with a heavy accumulation of soot. A thick accumulation of ash and charcoal lay beneath them. A similar fire bed about two feet in diameter lay directly on the Fort Union clay under twenty-four inches of topsoil. No artifacts were definitely associated with either bed. Throughout the site were many small burned fragments of sandstone similar to the slabs on the fire beds.

MATERIAL CULTURE

The artifacts, principally of stone, present a remarkable variety.[3] A lack of bone implements may be due to their decomposition, although a good representation of unworked animal bones was secured.

Notched Projectile Points

Type 1. These are side-notched points with flat to concave bases and convex blade edges which converge to a sharp point. They are widest at the base, the notches are oriented transversely and they are symmetrically lenticular in cross section. Characteristic are sharp, well defined corners about point, base and notches. On about 16 per cent, the base has been smoothed with an abrasive tool. One seems to have been resharpened on the shaft (Fig. 20 A, *1–6*).

This type of point is widespread in North America and particularly in the northwestern plains where it seems to be characteristic of fairly late horizons. It is the most common type in the Yellowstone country, its late position having been determined by its occurrence in Pictograph Cave III and IV and in Billings Bison Trap II, as well as its occasional association with historic burials. Similar points are characteristic of the late ceramic horizons of the area which have distant Woodland affilia-

[3] See Table I for metric and other observations on specimens described. For significance of relationships with Pictograph Cave and other unpublished sites in Montana see Conclusions.

tions. So far as is known, they are not found in early manifestations in this area. The points found at this site are somewhat thicker and proportionally broader than the general average, but there is little doubt that they represent the usual side-notched, concave base tradition.

Type 2. These points have some little variation. They have convex blade edges, a somewhat constricted tang, and a concave base. The tang varies from about one-third to one-half the total length of the point and is slightly broadened at the proximal end. There are no real barbs. Cross sections vary from symmetrically lenticular to irregular, and flaking varies from excellent to mediocre (Fig. 20 A, *7–12*).

Similar specimens are also found in many parts of the Yellowstone drainage. They are characteristic of Pictograph Cave I and II, both early horizons. There is also a vague similarity to the Pinto Basin type.[4]

Type 3. These are large corner notched points with convex blade edges and convex bases. They are widest at the proximal end of the blade and the oblique notches form definite barbs. The flaking is uniform and well done, the cross section being smoothly lenticular. In about 68 per cent of the specimens the base is ground smooth. One appears to have been resharpened on the shaft (Fig. 20 A, *13–17*).

Type 4. These are almost identical with Type 3 points except that the bases are concave. Otherwise outline, cross section, flaking and general appearance are substantially the same. None of the bases of this have been smoothed (Fig. 20 A, *18–23*).

Points similar to the latter two types are also familiar in most parts of the United States. In the Yellowstone country they are almost always found together. In stratigraphic relationship, they have been found underlying side-notched, concave-base specimens in Pictograph Cave II and in Billings Bison Trap I. They are also characteristic of another large bison trap near Glendive, Montana. In Signal Butte II similar points also underlie side-notched, concave-base points.[5]

Type 5. This is a rather crude, vaguely side-notched variety which is, in general, poorly executed. Blade edges are convex and notches are shallow. The base has a V-shaped concavity. Edges are irregular and flaking is poor. Bases are not smoothed. One has very shallow notches and a slightly serrated blade (Fig. 20 A, *24–27*).

Points exactly comparable to these are not common in this region. Some similar specimens occur in Signal Butte I.[6]

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[4] Wormington, 1939, p. 40. [5] Strong, 1935, pl. 24. [6] Strong, 1935, pl. 25.

Notched Knives

These have convex blades, concave bases, and large side notches placed very near the proximal end. They are well flaked, though somewhat irregularly. They appear both as little-used specimens with very convex blades and as much-used specimens with blades resharpened until they have become concave (Fig. 20 A, *28–29*).

Drills

These are bifacially flaked, narrow-bladed implements with a transverse broadening at the base. Most of the flaking is on the blade, the base usually being the unaltered flake. They would be equally suitable if held in the hand or hafted. Blade edges are smooth as if they had been rotated against some hard substance. They are well flaked with symmetrical cross sections. One specimen with a less pronounced broadening of the base and unifacial flaking probably belongs here (Fig. 20 B, *4*, *5*).

Type 2. These are substantially unaltered flakes, one corner of which (in one case two corners) has been unifacially flaked to a sharp, very short point. These show little evidence of wear and might be classed as gravers (Fig. 20 B, *6*, *7*).

Type 3. One is a sub-rectangular blade, well flaked bifacially. Its cutting end is flat and shows much evidence of wear as do the sides of the blade. It was probably hafted (Fig. 20 B, *8*).

All of these drill types are characteristic of Pictograph Cave III while similar specimens occur occasionally in lower levels. They are frequent in the Yellowstone country.

Unnotched Blades

Type 1. These seem chiefly noteworthy because of their unusually fine chipping, it being characterized by exceedingly long, narrow, uniform, transverse flakes which commonly extend more than half way across the back of the blade. Typically they are smooth and symmetrically made, with sides parallel or tapering slightly towards the base so that the point of greatest transverse diameter is nearer the point than the base. Distal to this section the point tapers sharply to converge in a wide angle. Bases are flat or concave. Cross sections are symmetrically lenticular. Over half show marked smoothing of the blade edges near the base. The base proper is smoothed on only one specimen, which has a flat base (Fig. 20 C, *1–6*).

The shape, unusually excellent flaking, and ground basal portions of these blades suggest some affiliation with Yuma points. They are very

similar to, but not identical with, recognized Yuma types.[7] The fact that the maximum breadth is frequently distal to the mid-point of length is more characteristic of Folsom than Yuma types. The flaking is certainly consistently superior to that on the usual Montana points. It must be pointed out here, however, that the idea of grinding basal portions of points is widespread in the northwest plains and frequently occurs on points from late horizons. Blades similar to these are found in Pictograph Cave I where they are associated with points of the Collateral Yuma Type.[8] Similar points occur frequently in the vicinity of Glendive, and from a cave near White Hall in western Montana. Somewhat similar points are found in Signal Butte I.[9]

Type 2. These are small, thin, rather asymmetrical blades with flat bases and more or less convex blade edges. The flaking is comparatively irregular, but the edges are sharp and most of the specimens would have made excellent knives (Fig. 20 C, *7–12*).

Type 3. These are very narrow, ovoid, bifacially flaked blades usually more pointed at one end than the other. One side is more convex than the other and occasionally specimens have a somewhat flattened base. Flaking is good to mediocre and edges are sharp. They could have served as knives (Fig. 20 C, *13–17*).

Type 4. Though similarly ovoid, this group is larger, and proportionately much broader than Type 3. They are bifacially flaked ovoids with an occasional flat base. Flaking is irregular and there is much evidence of the original percussion flaking by which the ovoid was blocked out. They are all pressure flaked to sharp, thin edges and would have made excellent knives. One has a notch in the side of one blade, as though it might have been hafted (Fig. 20 C, *18–21*).

Type 5. These seems to be blanks or partly completed implements. They are usually piriform with round bases and are almost exclusively percussion flaked. Little attention seems to have been given to thin, sharp edges, but the main purpose seems to have been to produce an artifact of the approximate gross shape. They would have been ideal blanks from which to make projectile points (Fig. 20 C, *22–25*).

Type 6. These are large percussion flaked, ovoid blades. A few may be cores while others are almost certainly finished implements. Some are made from large flakes struck off glacial pebbles and worked only on one side. Several have the sharp edges blunted as if they might have served as pecking tools, in which capacity they would have served

[7] Wormington, 1939, p. 24.
[8] Wormington, 1939, p. 29.
[9] Strong, 1935, pl. 25.

efficiently. Others look like scrapers. These are neatly bifacially percussion flaked ovoids with edges retouched by percussion (Fig. 20 B, *1–3*).

All of these latter types turn up frequently in the Yellowstone country. They cannot be identified because a lack of stylization prevents differentiation. They occur in all levels at Pictograph Cave.

Plano-Convex Scrapers

As at many other northern Plains sites, the most common chipped stone artifact is a small unifacially flaked scraper. Characteristically the tool is ovoid to vaguely triangular to irregular in shape. It is made of a small flake chipped only on the back, the face side being left untouched. One end usually presents a flat to convex edge which is usually very steep and blunt in comparison to the others and appears to have been the scraping edge. Four are pressure flaked over the whole back so that they present a symmetrical plano-convex transverse section. Others are merely roughed out by percussion, the only pressure flaking being on the edges, frequently only on the scraping edge. Usually the tool is so arranged that the bulb of percussion is at the base opposite the scraping edge, while the latter is at the concave portion of the flake just below the bulb, so that the edge is frequently slightly turned toward the face surface as in modern wood scrapers. The scraping edge is almost always pressure retouched and there is occasionally a little chipping on the face, usually to reduce a too large bulb of percussion or other irregularity. The most striking universal characteristic of this artifact is the fact that the flake progressively increases in thickness almost to the cutting edge where the latter drops off almost at right angles to form a very steep scraping edge. In some cases this steep portion of the blade as well as the scraping edge, is slightly smoothed as if it had been rubbed over a mildly abrasive substance. A few are made entirely by percussion, usually being roughed out by removing a very few flakes. Most look as if they were hurriedly made. One has a definite constriction just above the scraping edge which may have had something to do with the hafting. The largest seem to be the crudest (Fig. 20 B, *9–16*).

These ubiquitous artifacts are so little stylized as to have almost no diagnostic value at present. Interesting among the specimens here is the unusually small proportion of completely pressure flaked examples, and the almost complete lack of the large percussion flaked scrapers which are particularly characteristic of Pictograph Cave III. Needless to say, these appear in all levels at Pictograph Cave.

Retouched Flakes

Another type of seemingly improvised implement is made from almost any odd flake that presented any sort of edge. There was almost

never any appreciable modification of the original flake, other than a slight retouch along the edges. Frequently the edges appear not to have been retouched at all, the tiny flakes along them seemingly being the result of use. Edges may be concave, convex, or irregular. Many of these tools would have made excellent knives while all would have made fine scrapers. One unilaterally flaked specimen (Fig. 21 B, *20*) with a concave edge may have been a specialized implement (Fig. 20 B, *17–20*).

Miscellaneous Rough Stone

Tanning Stones (?). These are thin, flat, ovoid to subrectangular glacial pebbles of diorite. Each has had a flat facet rubbed on one of its lateral edges. This is the only modification. These stones look as though they might have been held vertically and rubbed over some finely abrasive horizontal surface. The wear on some specimens has been considerable and occasionally the rubbed surface has been flattened in two planes leaving a longitudinal ridge down the center of the flattened area. These might possibly have been hide tanning tools (Fig. 20 D, *1*).

These tools are known to the writer only from the central Yellowstone region where they are frequently found on the surface. Their only occurrence in stratigraphic relationship is in Pictograph Cave I.

Pestle. This is a rectangular piece of close grained sandstone which is almost square in cross section. It shows evidence of more or less pecking over its entire surface. One end is almost square, being slightly convex. The other has been brought to a convex bevel from one side. It looks like a pestle. Vaguely similar pestles are frequent surface finds and are characteristic of Pictograph Cave III (Fig. 20 D, *2*).

Metate. There is one fragment of a flat slab metate of fine vesicular basalt. It is rubbed smooth and slightly concave on one side while the other side is rough and unaltered. The fragment suggests that the artifact might have been ovoid and perhaps about 1.5 by .75 feet.

Mano. The single mano is made from a close grained, water worn, subrectangular sandstone pebble. Both of the flat sides show much evidence of rubbing, having been rendered quite flat.

The metate and mano are found in Pictograph Cave I and in Billings Bison Trap I. In later horizons they seem to have been replaced by the mortar and pestle. Broken metates are fairly frequent surface finds in the central Yellowstone.

Worked Bone

The whole site afforded only three pieces of worked bone. One of these is a fragment of a rib, probably bison, which has been broken off

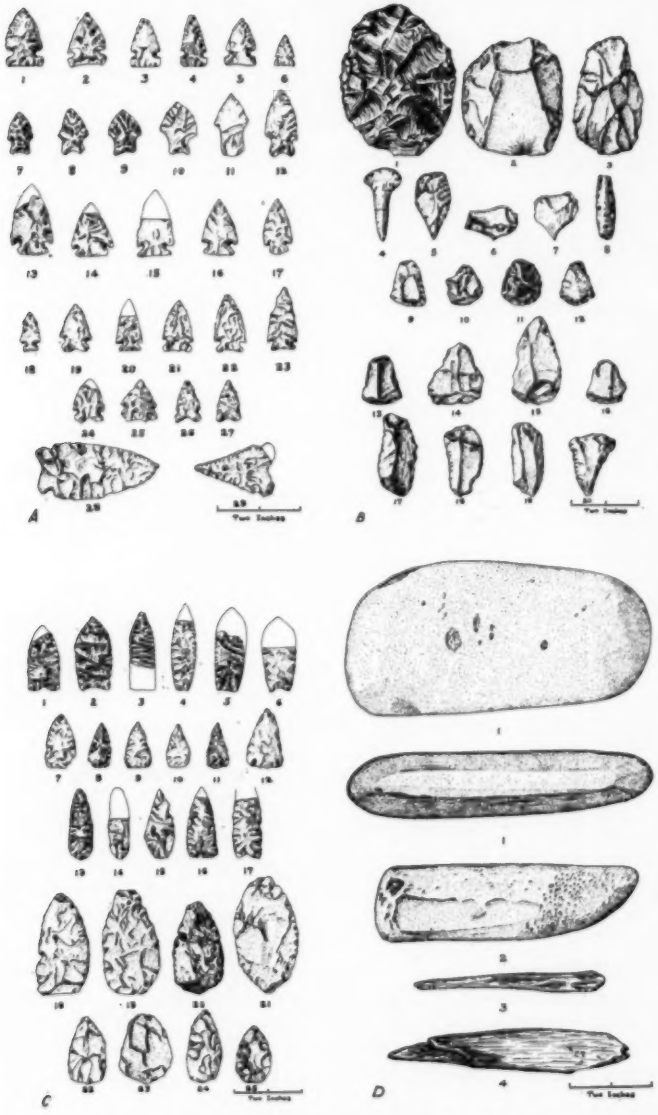

FIG. 20.—Artifacts from the Red Lodge Site, Montana.

TABLE ONE
MATERIAL CULTURE

	No. Specimens	Max. Length†	Min. Length†	Max. Width†	Min. Width†	Max. Thickness†	Min. Thickness†	Quartzite	Jasper	Chert	Obsidian	Flint	Basalt	Agate	Granite	Slate	Fossel Wood	Diorite	Sandstone	Bison Rib	Unidentified Fragment	Figure	Figure No.
Notched Projectile Point—Type 1	42	1.4	.8	.9	.5	.25	.11	16	13	5	5	3										1	1–6
Notched Projectile Point—Type 2	33	1.7	.9	.9	.6	.21	.13	14	5	4	6	2	1	1								1	7–12
Notched Projectile Point—Type 3	30	1.8	1.4	1.1	.6	.20	.14	10	12	4	1	1										1	13–17
Notched Projectile Point—Type 4	15	1.6	.9	.8	.4	.19	.11	3	4	3	1	1	3									1	18–23
Notched Projectile Point—Type 5	8	1.1	.9	.8	.6	.19	.15	4	3			1										1	24–27
Notched Knife	3	2.9	1.9	1.3	1.2	.25	.17	1				1	1									1	27–28
Drill—Type 1	3	2.4	2.0	1.1	.8	.21	.32	1	2													2	4–5
Drill—Type 2	4	1.6	1.2	1.2	.9	.19	.27		3				1									2	6–7
Drill—Type 3	1	1.9	1.9	.5	.5	.31	.31		1													2	8
Unnotched Blade—Type 1	18	2.†	1.7	1.1	.7	.14	.21	9	3	1	1	3	1									3	1–6
Unnotched Blade—Type 2	11	1.7	1.2	1.0	.6	.34	.21	3	7		1											3	7–12
Unnotched Blade—Type 3	16	2.2†	2.0	.9	.6	.31	.25	10	6													3	13–17
Unnotched Blade—Type 4	30	3.6	2.9	1.9	1.6	4.2	2.9	10	8	4	6	2										3	18–21
Unnotched Blade—Type 5	19	2.1	1.7	1.5	1.0	.41	.31	11	3	2		2	1									3	22–25
Unnotched Blade—Type 6	22	4.9	2.3	3.2	1.6	.75	.49	9	2		2		7	1	1	1						2	1–3
Plano-Convex Scraper	88	2.6	.8	1.6	.6	.9	.15	21	42			9	4	6			4					2	9–16
Retouch Flake	142	4.5	.9	2.1	.6	.7	.12	69	35	4	5	9	3	6	1		1					2	17–20
Tanning Stones (?)	10	7.4	5.1	3.6	2.3	1.3	1.0											10				4	1
Pestle (?)	1	6.4	6.4	1.7	1.7	1.4	1.4												1			4	2
Metate	1	?	?	?	?	?	?						1						1			—	—
Mano	1	3.7	3.7	2.5	2.5	1.2	1.2												1			—	—
Knapping Tool (?)	1	5.7	5.7	1.0	1.0	.4	.4													1		4	4
Awl	1	4.6	4.6	.4	.4	.2	.2														1		

† All measurements in inches.

at either end. One of the rough projections at one end has been ground to a smooth, rather blunt point which might have served as an awl or knapping tool. A second more definite awl is made of a thick broken fragment of a long bone. One end has been ground to a rather blunt point while some of the rough edges have been smoothed away from the base (Fig. 20 D, *3*, *4*). The left half of the mandible of a bear shows evidence of a single cut across the junction of the alveolar process and the ascending ramus which might have been made while skinning.

UNWORKED ANIMAL BONES

The fauna represented at the site includes the following species, kindly identified by Dr. Everett Claire Olson, of the Walker Museum of Paleontology, of the University of Chicago:

Artiodactyla

Bison bison—about sixteen individuals
Bison cf. bison—about four individuals
Odocoileus Hemionus—about fourteen individuals
Cervus canadensis—about three individuals

Perissodactyla

Equus—about one individual

Carnivora

Canis cf. latrans—about one individual
Mephitis hudsonica—about one individual
Taxidea taxus—about one individual
Euarctos americanus—about one individual

Rodentia

Cynomys ludovicianus—about two individuals
Microtus montanus—about eight individuals
Thomomys talpoidea—about eight individuals
Erithizon epixanthum—about four individuals

Dr. Olson writes:

"This is a well balanced fauna and not one in which animals used for food, or domesticated, form the only elements. Bison outnumber all other animals but do not occur in as great number proportionately as they do in the Hagen fauna.[10] The absence of antelope and wolves is noteworthy.

"The most striking feature of the fauna is the presence of the horse. The material is not sufficient to allow specific determination, but there is no doubt that they do pertain to *Equus*. All the other animals are those which might be anticipated in post-Pleistocene assemblages from

[10] The Hagen Site is a late prehistoric site near Glendive in eastern Montana with what appear to be principally Mandan-Hidatsa cultural relationships.

the vicinity, but according to present knowledge from post-Pleistocene localities, the horse should not be present. The possibilities of a reworking or errors in collecting should be investigated. The horse material is in essentially the same state of preservation as are the other bones.

"One other interesting feature of the fauna is that certain elements, notably the porcupine and mule deer, are larger than the average specimens found in the vicinity at the present time. This is particularly true of the deer, but I understand that there is considerable size variation in the mule deer from various localities at the present time. Certain specimens were about one fourth larger than any in the collections of the Field Museum of Natural History, yet the characters are all so similar to those in the collection that there seems to be no doubt that the specimens represent *O. hemionus*.

"If this represents a camp site, and the fauna suggests that this was the case, the absence of wolves (or large domesticated dogs) is interesting in view of the abundance of the forms in the Hagen fauna. The absence of antelope, which also should form a good source of food, also may be of some significance."

CONCLUSIONS

The variety of the material culture, especially in its relation to other manifestations in the region, renders the determination of its cultural locus difficult. Its closest relationships with anything now known in Montana are with Pictograph Cave, though the nature of these is most obscure. Pictograph Cave is a large cavern about ten miles southeast of Billings, the excavation of which has recently been completed by the Montana Archaeological Survey. This contained an exceedingly deep deposit, reaching a maximum depth of almost thirty-five feet in some sections. Material was abundant and stratigraphic differentiations were clear cut. It was possible to differentiate four distinct cultural horizons ranging from a historic-ceramic horizon at the top to one at the bottom which may have a fairly respectable antiquity as fairly typical Yuma points were found in it. The exact significance and relationships of these manifestations have not yet been worked out, though their material cultures have been studied. The levels have been designated Pictograph Cave I to IV, I being the earliest and IV being the historic level.

The Billings Bison Trap, located within the city limits of Billings, consists of a low cliff over which bison were driven to be killed on the rocks below. Here there is an extensive deposit of bison bones and associated artifacts together with an associated camp site. There are two horizons represented in stratigraphic superposition, Billings Bison Trap I and II. The earliest level is similar to Pictograph Cave II while Billings Bison Trap II seems to be referable to Pictograph Cave III thus confirming a portion of the Pictograph Cave stratigraphy.

The obscurity of the Red Lodge material culture lies in its inclusion of items peculiar to each of the three earlier levels of Pictograph Cave and to both levels at the Billings Bison Trap, but here without the stratigraphic differentiation that appears in the cave. This suggests that the site may have seen a very long occupation by several successive groups and later undergone disturbance perhaps conditioned by the swampy terrain.

The material all occurred in the black humus surface stratum from which it was removed in eight-inch levels. Practically all of the types occurred in all levels, the only peculiarity being a concentration of all types of artifacts near the bottom of the surface stratum. Thus no significant stratigraphic differentiation is observable. This relationship presents several possibilities. The site may have been occupied by a group characterized by an extremely variable worked stone complex and there may actually never have been any stratigraphic differentiation. This is unlikely in view of the fact that many artifacts are definitely stylized and may be referred typologically to different horizons. On the other hand there may have been a series of successive groups each contributing different artifacts. The extremely swampy conditions, of which there is definite indication, may have allowed the artifacts to sink through the swamp muck to become stabilized in position near the bottom of the stratum. This could have produced the peculiar concentration at the bottom of the humus deposit. That the site was occupied at least as long ago as the beginning of the formation of the humus stratum is suggested by the fire place which lay at its bottom. The condition of the swamp may have had an annual differential and camping here may have been seasonal with intervening periods of greater moisture.

Purely on the basis of the typology of the artifacts, their differential relationships, and the attendant swampy situation, the writer feels that the site probably saw a long occupation by successive groups with subsequent destruction of stratigraphic differentiation by natural forces. This is somewhat difficult to account for, as the site is not, by present standards, an unusually desirable camping place. However, in times past the site could have been much more heavily vegetated than at present thus providing the firewood now lacking.

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Montana State University
January 1, 1942

PHYSIOGRAPHY AND SOME ARCHAEOLOGIC IMPLICATIONS IN THE KENTUCKY BASIN

DOUGLAS OSBORNE

RESULTS in the synthetic studies of archaeology and phases of Recent physiography and geology are not unfamiliar to investigators in many parts of the world. These are generally concerned, however, with somewhat ideal conditions, cave or arid, for both archaeologic discovery and the revealing of physiographic succession.

This study, working with later cultures and often not too discernible landforms was an attempt, admittedly not conclusive, to investigate the possibilities of such an association in the Southeast. It was originally drafted, with a much more thorough geologic and physiographic discussion, as a section of the introductory part of an archaeologic report which the University of Tennessee will issue when the staff has completed the investigation of the Kentucky Basin. As it will be several years before the work and the concluding report can be completed it seemed best to present the paper in this form and later to rewrite it in the light of the new archaeologic and physiographic material which may be expected.

It has been a recent trend, thanks to the broadening view of many investigators, to stress more than the technical, the typologic, and even the distributional or ethnologic implications in archaeology. This search for greater truths, perhaps sociologic, or concerned with generalities regarding the processes of development of human utilization, is laudable. I have attempted, herewith, to do a bit in this combination anthropogeographic-historical-geographic approach. The latter is deepened by a liberal use of the geologist's points of view.

An attempt has been made to present the problems of a peculiar area from the standpoint of at least two sciences. The meeting point, superficial but important, is stressed by the enumeration of likely associations of small river bottom landforms and archaeologic cultures. Suggestions for a physiographic-archaeologic chronology (for early cultures which never yield dendrochronologic specimens) are made. The possibilities of early man, or of upper river-terrace cultures, are scouted.

Such an approach as this cannot always be insisted upon. Its liberal use, however, might uncover some rather significant associations.

The coincidence between the Western Valley physiographic region and the Tennessee Valley Authority's Kentucky Basin is close. With the exception of an indeterminate area from the Pickwick Dam on up into Mississippi and Alabama and probably a few miles past the Mississippi-Alabama line, the region can be said to center wholly around

the Kentucky and Pickwick Basins. The physiographic boundaries separating this tributary unit from the Ohio Valley include, albeit rather vaguely, the area of the Kentucky Basin in that state and run downstream for a short distance toward the confluence. Borings have established that the riverlaid sediments in the Ohio Valley proper extend to a much greater depth (to or below sea level) than do the same alluvial deposits in the Tennessee Valley around Kentucky Dam. There is, consequently, a buried fall and gorge, perhaps comparable to the Niagara Falls and cut, somewhere in this short distance.[1] While the main features have not yet been located it would seem that the upper rim of the buried fall would form an excellent physiographic land mark—at least one sufficient for the present discussion.

The width of the physiographic unit varies between ten and twenty miles. Its east-west limits would be the broken, western edge of the Highland Rim and the irregular Mississippi-Tennessee divide along the crests of the eastern uplands of the Mississippi embayment of the Gulf Coastal Plain. The eastern boundary, in particular, is broken by the valleys of the large-west-flowing tributaries. Here a number of fine, wide bottoms, particularly those of the Duck River, have furnished the rich environment for a florescence of the later, agricultural, archaeological cultures.

The areal extent of the Western Val-

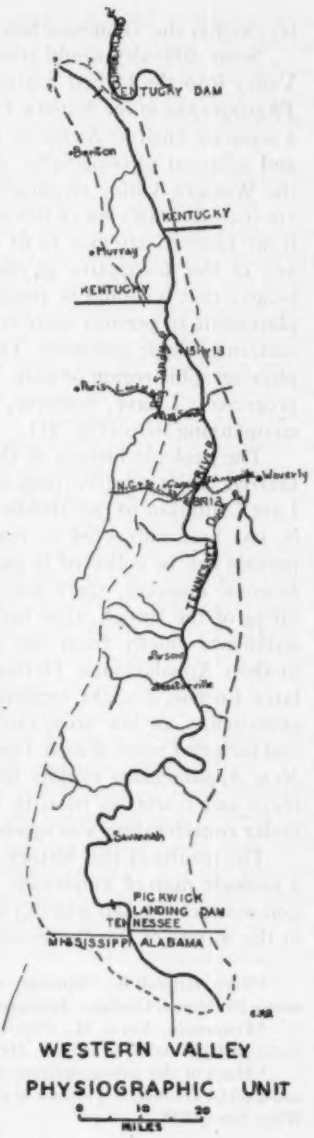

FIG. 21

[1] Personal conversation with Dr. L. C. Glenn, chairman of the Department of Geology, Vanderbilt University. Here I take opportunity to acknowledge my debt to Dr. Glenn. He was most kind and informative during our short interviews. I shall often make reference to information or theory derived from him.

ley, within the Tennessee boundaries, would be about 800 square miles.[2]

Some difficulty would arise if one were to attempt to fit the Western Valley into the United States physiographic picture. Fenneman, in his *Physiography of the Eastern United States*, does not mention the area as a separate entity.[3] As far as I have found, only students of Tennessee and adjacent physiography, seem at all sure of the actual existence of the Western Valley physiographic section. Many of their descriptions are tentative. In view of this uncertainty among authorities I do not feel it my place to attempt to fit the dissected, rugged Western Valley into any of the descriptive physiographic schemes so far set up. While I believe that it should be recognized as a discrete unit, I shall leave that placement to persons more cognizant of and more interested in southeastern geologic problems. The Western Valley is here referred to as a physiographic region or unit. That should be sufficient as the discussion progresses. I have, however, attempted to outline the unit in my accompanying map (Fig. 21).

The geologic history of this unit stands partly clear and partly as blurred as its relative present-day physiographic position. From the Late Cambrian to the Middle Upper Cretaceous, the region, or parts of it, has been subjected to marine procedure. Fossils of several of the periods can be collected in parts of the Valley. During the Upper Cretaceous, however, there was a retreat of the waters and a complete filling of the trough, that had extended through west Tennessee, with sediments chiefly from the peneplaning highlands to the east—the modern Appalachians. During Early Cenozoic time, Paleocene or the later Eocene, a slight tectonic activity existed. In Eocene time, the geosyncline, or low area, ran up the present lower Mississippi Valley and included most of west Tennessee. The erosion and denudation of the New Appalachians rapidly filled this embayment with sands, gravels, clays and marls, so that, in the ensuing Oligocene period, the region under consideration was again dry land. It has so remained.[4]

The results of this history are apparent to anyone who will examine a geologic map of Tennessee. Here the sediments, marine and possibly non-marine, overlap and dip down to the West as they were laid down in the waters of the Cretaceous and Eocene embayments or lakes. The

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[2] Born, Kendall E., "Summary of Mineral Resources of Tennessee," State of Tennessee Division of Geology, Resources of Tennessee (2nd series) Nashville, 1938, p. 8.

[3] Fenneman, Nevin M., *Physiography of the Eastern United States*. New York: McGraw-Hill Book Co., 1938, p. 444.

[4] Much of this paleogeographic material has been outlined from Schuchert, Charles, and Carl O. Dunbar, *A Textbook of Geology*, Part 2, *Historical Geology*. New York: John Wiley Sons, 1933.

edges of the sedimentary layers form nearly parallel bands running north-northeast and south-southwest as they cross the map. The earliest of these formations comes to the surface in the east and the later ones appear as one progresses westward. The Mississippi-Tennessee divide lies generally along the Eocene-Cretaceous contact. Consequently the Tennessee River drains, mostly, the pre-Tertiary zones.[5]

It has been intimated that the problems of the Western Valley go deeper than those of its present day physiographic position. The question of its very birth is still unsolved. The situation of a major river flowing northward and carving its valley across the dip of the land is, to say the least, anomalous. Chamberlin and Salisbury have attempted to explain the situation by piracy of the original Tennessee, which supposedly flowed a little north of west across the Coast Plain to the Mississippi from a point somewhere in northwest Alabama, by a smaller north-flowing stream.[6] Not only does this beg the question by still leaving us a north-flowing stream to explain, but it also involves the difficulty of explaining the capture by a small, short stream with low gradient of a larger. Then, too, we must still discover the course of the old Tennessee across west Tennessee to the Mississippi. Neither explanation of the latter, nor the abandoned valley of the former appear to exist.

Fenneman suggests that not only the northward course of the river but its northwestward course across Alabama might have been conditioned by coastal sediments.[7] In line with this Dr. Glenn has theorized that the northward flow of the river might well have been brought about by the offshore bar-lagoon complex so common in shallow continental seas.[8] Dr. Glenn postulates a Tennessee River flowing across the southern part of the Highland Rim and emptying into the Early Eocene sea somewhere in the northwest corner of Alabama or in Hardin County, Tennessee. This is, of course, in the area now encompassed by the boundaries of the southern extreme of the Western Valley. From this point north, along the eastern shore of the old embayment, he envisages the development of offshore bars and lagoons. A bar developing at the mouth of the ancestral Tennessee would materially aid the situation. Such a physiographic setup, when raised by the early Cenozoic upwarp to the east, could conceivably have led the flow of the trapped Tennessee to the north. One thing is certain: sediments, tectonics and physiography had provided every arrangement necessary for such development. To me, it seems a most logical theory.

[5] Roberts, Joseph K., and R. Lee Collins, "The Tertiary of West Tennessee," *American Journal of Science*, Vol. 12, p. 232. September, 1926.

[6] Fenneman, *op. cit.*, p. 444.

[7] *Ibid.*, p. 444. [8] Glenn, personal conversation.

We may now move on to a discussion which has more bearing on the present day problems, particularly those of archaeology.

During Cenozoic times a series of gentle upwarps caused repeated incisions of new base levels and the formation of new peneplanes throughout the Appalachian region. Some of these minor disturbances have been felt in west Tennessee and are recorded by the remnants of old floodplains. These terraces, mostly Quaternary in age, although Jewel suggested that the highest of these in Hardin County might be Pliocene,[9] are observable in a badly eroded condition at various places along the river. There have been three bottoms or terraces, ten to fifteen feet above one another, recorded at Pickwick.[10]

Tennessee Valley Authority borings, carried on by engineering geologists, have demonstrated the existence of heavy accumulations of alluvium from ten to hundreds of feet thick below the present floodplain.[11] This sedimentary fill, in an old deeply incised channel, taken together with the presence of terrace remnants high above the present levels, betrays the fact that the river, once flowing high above its present stand, was forced to down-cut toward a new base level, by a sharp and rather important uplift. This uplift may have been coincidental with that which eventually formed the Harrisburg peneplanes in the northern Appalachian country, or it may have been much later. Certainly much of this alluvium is Pleistocene or Recent although no correlative work has been done which might clear up the question. After this deep incising by the river, a slight subsidence or an aggradation of the whole Mississippi system, more probably the latter, caused the filling of the incised channel to some depth, as has been mentioned. This Quaternary filling probably continued to somewhat above the present river level. The floodplain of today generally stands thirty to forty feet above low water.[12] The elevation of this last terrace is roughly 320 to 330 feet above sea level. A second bottom is usually present twenty to twenty-five feet above this, i.e., at about 350 feet above sea level.[13] It is likely that the filling continued up to or perhaps beyond the present second bottom, or 350 feet above sea level mark. Degradational processes then set in, brought about by a slight uplift, or perhaps some climatic changes, and have continued down through the most recent times. At the present, the Tennessee, in common with most of the rest of the Mississippi River system, has brought itself fairly closely at grade.

[9] Jewel, W. B., "Geology and Mineral Resources of Hardin County, Tennessee," State of Tennessee Division of Geology Bulletin 37. Nashville, 1931, p. 49.

[10] *Ibid.*, p. 14, also Rose, in Eckel, Edwin C., "Engineering Geology of the Tennessee River System," Tennessee Valley Authority Geologic Division, Technical Monograph 47. Knoxville, 1940, p. 74.

[11] Rhoades in Eckel, *op. cit.*, pp. 37, 45.

[12] Jewel, *op. cit.*, p. 15.

[13] Rhoades, *op. cit.*, p. 45.

Geomorphologic and climatic studies have not yet brought to light any important features that can be locally associated with the Pleistocene glacial or pluvial periods. An exception to this would be the so called Tertiary loess which has been found, most infrequently and patchily, east of the River and may have blanketed the Western Valley fairly thoroughly at one time. Then, too, there may be some relationship between some of the later periods of downcutting of the Tennessee and the later pluvial periods.

While there are no finds of possible early man to bring the problem of these terraces into prominence, we can be certain that the intensive study by the University of Tennessee will either bear fruit in this respect or will cast doubt on the local existence of such manifestations.

The present climate of the Western Valley, in common with most of southeastern United States, falls, in the Koeppen classification, into the "Cfa" or Washington type of climate. This is a mesothermal, continental, moist, forest climate with mild winters.[14]

The podology of the Western Valley, is, of course, one of the major anthropogeographic factors. This is not much more so now than it was in aboriginal times. Outside of a few highly favored localities the floodplain or bottom soils, and the drainage, are not of the best. All of this alluvial material is poorly sorted. The upper few feet of the floodplain are mingled silts, overflow materials and loams and heavy, gritty clays. This zone is more or less impervious. Below this the pervious zone is sandy clay and sandy gravels with an increase of larger gravels as one bores deeper below the river.[15] Derived clay with hardpan close to the surface is an all too common soil type, at least on the "second bottom" or the last floodplain terrace. These soils, at least in their present formations, are mostly of recent derivation. As one ascends the sides of the valley he passes progressively older terraces and soil deposits.

Phytographically, the area falls into the Temperate Decidous Forest area of Shelford.[16] Shantz and Zon expand the classification somewhat and list the area as an arm of the Cypress-Tupelo-Red Gum-River Bottom Forest area of the Mississippi River.[17]

Faunally, the area is, at present, one of small game. Archaeologically, many of the bones of the larger Felidae, beaver, deer, elk and bear are all far from uncommon. Fish were as important in aboriginal times

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[14] Goode, J. Paul, *School Atlas*. New York: Rand McNally Co. 1937, pp. 20, 21.

[15] Rhoades, in Eckel, *op. cit.*, pp. 46–47.

[16] Shelford, cited by Kroeber, Alfred L., *Cultural and Natural Areas of Native North America*, University of California Publications in American Archaeology and Ethnology, Vol. 38. Berkeley: University of California Press, 1939. Map. 3.

[17] Shantz and Zon, cited by Kroeber, *op. cit.*, Map 4.

as they are now, while shellfish, now a commercial item for the shell, were formerly esteemed as food.

Worthy of note is the fact that, as far as I know, buffalo bones were not found in any of the sites so far excavated in the Kentucky Basin. Bison sp. has been reported historically from the states of Florida, Tennessee, Kentucky, Illinois, Indiana, and the Carolinas.[18] Bones have also been reported from various licks in Kentucky and Tennessee. Why the bones do not occur archaeologically in the Kentucky Basin sites is probably a problem of zoodistribution and relative chronology.

White utilization of the Valley, exclusive of the important phase of river transportation, has been prevailingly agricultural. Timbering, principally the rural preparation of cross-ties, hardwood shipping and sawing, and dyewood cutting is a minor and seasonal industry. Fishing and digging of mussel shells also is generally seasonal and supports a small population at best. Towns along the river or in the Western Valley are few and not important. The Valley is fed by a fairly close network of gravel roads. These, when kept up, form an excellent system, not so much connecting various points within the Valley, as running into it from the towns on the uplands to the east or west. The Western Valley, we thus gather, is something of a hinterland.

Even the farmers who work land in the floodplains lead, as probably did their aboriginal predecessors, a sort of semi-transhumanic existence. Their homes are scattered along the edging uplands; their work, during planting and harvest, is in the bottoms.

So far little has been said that is in any way pointed toward a synthetic discussion of archaeology and physiography. Most of the study has been directed toward the physiography and a description of present conditions and utilization.

Before embarking on this last phase of the paper it would be well to direct a few remarks at an enumeration of the physiographic process and small physiographic forms of the present, within the bottoms themselves. We may pass over the present erosive cycle encumbent upon maltreatment of the land without more than the mention. The first of these minor forms, the natural levee, lacks the development, along the Tenessee, that it has on many more northern streams. These ridges, formed by settling in shallow water during flood times, often cause a river which is aggrading to raise itself by its very bootstraps. Thus the sediments settling along the banks build these higher; those settling in the actual river bed raise the stream and, in time, the river may come to flow partially above sections of the floodplain. In time, of course, it

[18] Allen, J. A., "History of the American Bison" *United States Geological and Geographical Survey of the Territories for 1875* (Hayden Survey) p. 509.

breaks through or over the natural levee and finds a new course over the floodplain. This upbuilding of sediments along the present or old river bank, in the form of the natural levee, might possibly furnish us with a scale which could grow to have archaeological significance. University of Tennessee site 15Hy13 (excavated by George A. Lidberg) in Henry County, is a case in point. This site, and others dug, which are or have been associated with a natural levee, are often found to have been buried to some depth in the sediments. Below the best manifestation of the site occurred sandwiching bands of sterile silt and then darker occupation layers. If this sort of sequence can be related to actual periods of fluctuation in the river history, and this physiographic and cultural stratigraphy tied together, we shall have a broader base upon which to rest our archaeologic theory and fact. Such work is now being carried out by the University of Tennessee laboratory.

Another characteristic is the continual swell and swale observed in crossing the surprisingly narrow bottom or floodplain of the Tennessee. This up and down is the result of a series of depressions which run longitudinally along the floodplain. They braid in and out, join the river and leave it in a manner bewildering to the topographer. These swales are either old channels, perhaps abandoned as previously outlined, or are simply flood channels. Dr. Glenn leans toward the latter belief when the swale or channel is straight and joins the river at both upper and lower end.[19] In this case he would call it a sluiceway and liken the whole river, at flood time, to an anastomosing stream, as part of the flood waters find their way down the sluiceways or old channels. On the other hand when the swale or long depression is fashioned in sweeping curves one might be inclined to put it down as an ancient channel. Be this as it may, and it is probably a question to be answered for each swale, the fact does remain that archaeologic sites have often been found on these old channels. Those have occasionally been potteryless and have otherwise had an appearance of age. One of them, University of Tennessee 6Bn12 (excavated by the author) near Eva, Benton County, was a typical shell mound and yet it stood apparently on an old natural levee at least a mile from the present river. This situation, it seems to me, definitely associates what we are calling the Archaic culture (probably pre-Woodland, and at least a culture that was non-agricultural, semi-sedentary, used antler, bone, and stone and made flexed dolichocephalic burials) with an early part, perhaps the earliest of the present phase of floodplain sedimentation. One fact, of interest and which should be of value to analysts concerned with field work in the Kentucky Basin, is that at a number of these bottom sites, both near and far from the pres-

[19] Glenn, personal conversation.

ent river bed, has been observed a sterile sandy band, often separating two usually similar occupations. It might be doubted if this has any inter-site or whole basin significance, but it may represent a similarity of occupational history at the various sites. Certainly this stratification of sandy silt and midden layers, often several in depth, observed at 6Bn12, 15Hy13, and other sites in the floodplain, is indicative of floodplain raising and aggradation. The fact that the floods and their attendant sandy deposits, often six to eight inches thick, occurred several times during the life of a site, and usually only interrupted its occupation, would seem to point to a period of rapid deposition associated with an early period of human utilization of the Western Valley. If we can judge correctly from the recent flooding and what is known about the generally short period of occupancy of most Indian villages, the verdict might be rendered that the period of floodplain upbuilding which here concerns us was rather short. An attempt to relate it to some known period of minor climatic variation would, at present, be altogether too theoretical. When the archaeologic, geological, and geographical knowledge now being gathered by the Tennessee Valley Authority is available, the case may be different.

Another floodplain manifestation which deserves recognition at each site excavated is the local development of the first, second or sometimes even third bottom. These are the last or present and lowest floodplain; the second bottom or first terrace above the floodplain and the third bottom or second terrace. This latter is not often identified. The second bottom has been found, at least in the central part of the basin, to ca ry a thin but most extensive evidence of an utilitarian flint industry, and, often, of a cord-marked grit-tempered ceramic complex. One excavation on this physiographic unit has added open-cornered wall trench patterns and small triangular projectile points to the above list, another has added a mound burial complex, while a third has confirmed the triangular projectile point association. The obvious question here is: does this occupation associate with the time when the first terrace or second bottom was the actual lowest floodplain or river bank, or were the now badly plowed and eroded villages placed there as a measure of flood protection with closest possible access to the river? Because of the narrowness of the Tennessee floodplain, and the known frequency and rapidity of its flooding, at least in late years, I am inclined to follow the latter belief. One thing, however, is certain. There has been, and is, a rapid turnover of the first into second bottom and island into mainland along the river. Two sites in Benton County, that at Lick Creek and another at Sulphur Creek, both now on the second bottom, were located above areas which were either under water or subject to regular

flood "forty-five to fifty years ago." In the first case an island, by the usual process of sidewise, headward and tailward accretion, had merged itself with the mainland, and the first bottom adjacent to both is now typical dry land. The "forty-five to fifty years" might date these changes back to the big flood of 1897. Then, too, we know from local residents that the deep boat channel has varied across the whole river, in places, in the last half century. If such variance, and the above mentioned filling, is possible in fifty years, how long did it take the river to leave its last terrace, the second bottom, on an average of a quarter to a half mile inland? That is a question not easily answered—but a pertinent one. It is especially so, in view of the questioned association of the second bottom and its cultural occupation, when one considers that some of the largest and certainly latest Mississippi sites, the latest and often most spectacular, lie on the very river bank, the present natural levee. This has, however, been built in some places to a height nearly equal to the local second bottom expression. Thus it has, in these localities, afforded as good protection as this latter unit. Were the associations of the first bottom and late Mississippi, and second bottom and sites of grit-tempered cord-marked ceramic complex, possibly early Mississippi, invariable and certain, one would certainly be inclined to consider the physiography and archaeology in one chronologic breath. The associations, however, are far from invariable although there is some correlation; that is, could not the second bottom have been populated when the river was not as securely entrenched in its present channel as it now is, and the late Mississippi occupation belong to approximately the present period?

It is to be hoped that this and other like problems will receive more attention than their often partial obscurity and their difficulty seem to warrant. The facts recorded by a keen observer of minor as well as major physiography in relation to site placement are certainly destined to loom large in the final picture of aboriginal settlings and movements in the Southeast. It may be expected that some of the problems raised will approach solution with the continuing of work in the Kentucky Basin, in both Kentucky and Tennessee.

University of Tennessee
Knoxville, Tenn.
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EXCAVATION OF MESA VERDE PIT HOUSES[1]

JAMES A. LANCASTER AND DON W. WATSON

DURING the autumn of 1941, excavations in Modified Basketmaker sites in Mesa Verde National Park were carried on, for the twin purposes of clearing well-preserved pit houses that could be used in the interpretative program of the park and of adding to the meager amount of information on Modified Basketmaker culture in the park area. Although this period has been studied extensively in adjacent districts, little work has been done on it in the Mesa Verde.

In 1919, Dr. J. W. Fewkes excavated a pit house, which he referred to as Earth Lodge A, on the mesa-top near Square Tower House.[2] No detailed report was made on the excavation, and the artifacts obtained were removed from the park. In 1926, Superintendent J. L. Nusbaum excavated three Modified Basketmaker pit houses in the south end of Step House Cave. This was an important site, as the north end of the cave contained a cliff-dwelling. The pit houses were covered with a sterile layer of cave debris, above which was a deep accumulation of trash from the pueblo. These pit houses, located far from a road, have not been usable in the interpretative program as exhibits.

There has long been need of readily accessible excavated ruins of the Modified Basketmaker period, fitting into the sequence of cultural periods presented on the guided tours. The vicinity of Pit House A (Earth Lodge A) seemed to offer the best possibilities.

On the mesa-top around Pit House A (Earth Lodge A) were supposed surface evidences of many sites—clusters of fire-reddened stones, which have always been thought to indicate burned pit houses. Test pits sunk in several of these, however, found only sterile earth. A burned pit house was finally found at a location which had also many small pieces of burned adobe on the surface. This site, about 200 feet north of Pit House A (Earth Lodge A), was designated Pit House B.

Pit House B had burned completely, and the fire-hardened walls were easy to follow. The fill, removed in three-inch layers, consisted of hard red earth near the surface and, lower down, earth, burned adobe, and charcoal, with no occupational fill or refuse. The walls still held much of their plaster, and the adobe floor was in excellent condition, baked hard by the fire which destroyed the roof.

Pit House B proved to be a typical Modified Basketmaker dwelling, consisting of a large roundish room with an antechamber on the south.

[1] Published with the approval of the Director of the National Park Service. The authors held the positions of Archaeological Foreman and Park Naturalist, respectively.

[2] Fewkes, J. W., *Field-work on Mesa Verde National Park, Smithsonian Institution*, Miscellaneous Collections, Vol. 72, No. 1, p. 58.

Architectural features were similar to those of structures of the same period excavated in surrounding districts by Brew,[3] Martin,[4] Morris,[5] and Roberts.[6] The general plan and the specific features—post-holes, fire-pit, deflector, "sipapu," other holes in the floor (including ones filled with sand), partition walls, wall plaster, bench, storage niche—all correspond to the established general pattern of such houses.

In one respect there was a slight variation of a common feature. In the majority of these pit houses, a partition across the south side of the main room set off a small compartment. This partition was made of adobe, slabs, and posts in various combinations; sometimes part of it was merely a low ridge of adobe on the floor. Often the two roof supports on the south side of the room were incorporated in the partition wall; sometimes it extended directly across between them, while in other cases it extended to the firepit.

In Pit House B this partition was merely suggested. The two southern roof supports were joined to the wall by slabs of stone. From the post in the southwest corner a slab, 18 inches high and 20½ inches wide, extended toward the firepit, supported by a heavy base of adobe. In this position next to the post in the southwest corner the adobe floor was somewhat rough and broken, and it is possible that a slab once stood there. Thus, it would seem that instead of having a partition wall across, or most of the way across, this pit house had two short wing walls that suggested the partition.

The function of the three holes in the floor, *h*, *i*, and *j*, is not known. Only one, *j*, was smooth and cylindrical like a post-hole. At *h* and *i*, a cavity dug under the floor had been filled with ashes and burned adobe and then plastered over with two inches of adobe. Holes, *h* and *i*, may have been merely spots where this plaster broke through.

Along the north side of the main room, a number of charred roof beams were found as they had fallen. Their positions and spacing indicated fairly clearly their original arrangement. Additional evidence as to the method of roofing is afforded by charred post-ends and by a large amount of burned adobe with imprints of the beams supporting it.

In the main room the four roof supports were probably as high as a man's head and forked at the top. Four slender logs were placed from

[3] Brew, J. O. Preliminary report of Peabody Museum's southeastern Utah expedition of 1933 (unpublished ms.; final report in press).

[4] Martin, P. S., *Modified Basket Maker Sites, Ackmen-Lowry Area*, Field Museum Anthropologist Service XXIII-3, 1939.

[5] Morris, E. H., *Archaeological Studies in the La Plata District*, Carnegie Institute Publications 519, 1939.

[6] Roberts, F. H. H., Jr., *Shabik'eschee Village*, Bureau of American Ethnology Bulletin 92, 1929.

the top of one post to the next, forming a square framework. Slender poles, their butts resting at the outside edge of the bench and their tops leaning against the framework, were placed around the room at intervals of 15 to 18 inches. Other poles were placed across the flat section of the roof at similar intervals. Over this framework was placed a layer of poles and split poles and the entire structure was covered with a thick layer of adobe mixed with large quantities of corn husks.

The antechamber also had four roof supports, so it was probably roofed in the same manner. The passageway between the two rooms may have had a tunnel-like roof of its own, or the roofs of the rooms may have been blended together to cover it. The subterranean portion of the passageway was so shallow that the passage was principally above ground, and its roof was probably as high, or almost as high as the roofs of the two rooms. The two small posts by the deflector may have played some part in the roofing of the passageway.

Because of the presence of the firepit in the main room, a smoke hole in the roof may be taken for granted. This smoke hole may also have served as an entrance. The presence of pottery vessels on top of roof adobe would indicate that the roof was used for domestic purposes. Since there was no firepit in the antechamber, no smoke hole was needed in the roof; but the general plan of pit houses of this type indicates that there must have been an opening in this room, probably a door in the south wall. The never failing presence of a deflector indicates that a draft was coming into the main room from the antechamber. The occupants of the houses, sleeping on the floor through necessity, evidently soon learned that they could not sleep comfortably unless the draft was broken up or lifted off the floor.

Large quantities of burned roof adobe were found in the pit house. It bore not only the imprints of the poles on which it had rested but was full of imprints of vegetal materials it had contained. Great quantities of corn husks had been kneaded into the adobe; almost every piece bore the unmistakable casts. Corn cobs, leaves, and tassels, and oak leaves had also been mixed into it. Some fragments of this burned adobe were as thick as five inches, evidence of a strong, serviceable roof.

The presence of large quantities of corn husks in the roof adobe brings out an interesting point concerning the construction of the roof. Usually the framework of poles was covered with a mat of withes, sticks, bark, reeds or coarse grass, and the adobe was applied to this. In Pit House B, this matting of fine materials did not exist. The framework was covered with a layer of poles and split poles and the adobe was applied directly to these. The corn husks were kneaded into the adobe before it was placed on the poles. The wadded nature of the husks and

a.

b.

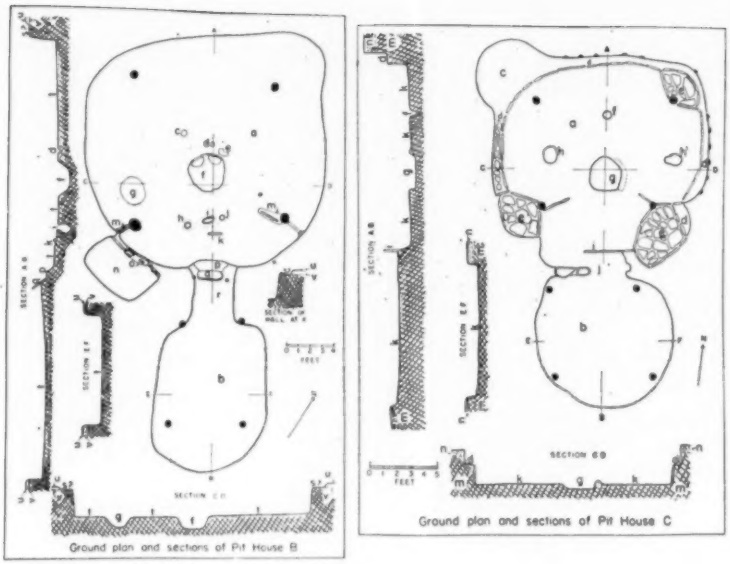

FIG. 22

ARCHITECTURAL FEATURES, PIT HOUSE B

a. Main room. Shape: roughly circular. Walls: plastered native earth. Average diameter, 20 ft. Average depth from original ground level, 26 in.
b. Antechamber. Shape: roughly rectangular. Walls: unplastered native earth. Dimensions: 9×12 ft. Average depth from original ground level, 14 in.
c. Cylindrical hole, 14 in. deep, 5 in. in diameter; full of white sand.
d. Sipapu, 2½ in. deep, 3½ in. in diameter; smoothly plastered.
e. Irregular hole, 7 in. deep.
f. Firepit, Diameter, 36 in.; depth, 12 in. Lined with adobe plaster and two stone slabs. Contained no ashes.
g. Bowl-shaped cist, 24×29 in.; depth, 11 in. Full of fine sand.
h. Hole in adobe floor; diameter, 5 in. Irregular cavity below, 12 in. deep. Full of ashes and burned adobe.
i. Irregular hole in adobe floor; 5×12 in. Irregular cavity below, 14 in. deep. Connects with cavity of h. Full of ashes and burned adobe.
j. Smooth, cylindrical hole; diameter, 5 in.; depth, 6 in.
k. Sandstone slab on edge; 3 in. high. Had been higher but was probably broken by falling roof. Possibly a deflector.
m. Adobe base; 8 in. high, supporting sandstone slab 18 in. high.
n. Storage niche; 30×66 in. Walls and floor of plastered native earth. Floor of niche 16 in. above room floor and 10 in. below original ground level.
o. Collar of adobe and flat stones, 1½ in. high, across opening of niche.
p. Adobe step; 7 in. above room floor.
q. Deflector. Stone slab, 26×17×1½ in., leaning at a 45° angle. A small charred post at each end of the slab.
r. Passageway. Slopes upward from the antechamber to the deflector.
s. Bench. Traces of plaster on the original ground surface indicated that it served as the bench. At x was a remnant of an adobe collar 2½ in. high. The width of the bench could not be determined and there was no evidence as to where the side roof supports had rested.
t. Floors. Main room; packed adobe; antechamber; native earth.
u. Present ground level; from 3 to 6 in. higher than original ground level.
v. Original ground level. Around the main room the original ground surface served as the bench.

the manner in which they ran all through the adobe indicated that they had been thoroughly kneaded or puddled into it. The high husk content of the adobe kept it from running through the cracks before it hardened.

Pit House C is located on the crest of the mesa, about one-fourth mile north of Cliff Palace. A number of years ago, during work on the Cliff Palace road, the removal of a tree revealed traces of a burned pit house underneath the surface. Charcoal was present in abundance, so on three occasions dendrochronologists were permitted to dig in the ruin in an effort to get dates for the structure. Dates for mesa-top ruins have been badly needed but difficult to obtain. A tree-ring date of 612 A.D. resulted from this study. Tree-ring dates have not yet been secured from the charcoal from Pit House B.

● Post-holes. Four in main room, one in each quadrant; diameters ranged from 7 to 12 in. Two on north side contained charred posts; two on south side, 20 in. deep, contained fragments of charcoal. Post-hole at each end of deflector containing charred posts, 2½ and 3 in. in diameter. Four post-holes in antechamber, one in each quadrant, containing charred posts 4½ in. in diameter.

Sandstone slabs standing on edge. The two roof supports on the south side of main room were joined to the wall by slabs 18 in. high. From the post in the southeast quadrant a slab, 20½ in. wide, 18 in. high and 1½ in. thick, extended toward the fireplace, supported by an adobe base 8 in. high. Slabs formed a partial partition between the niche, n, and the main room.

Flat stones incorporated in the adobe collar across the opening to the niche.

ARCHITECTURAL FEATURES, PIT HOUSE C

a. Main room. Shape: roughly circular. Walls: above bench, plastered native earth; below bench, sandstone slabs. Average diameter, 16 ft. Average depth below original ground level 26 in.

b. Antechamber. Shape: circular. Walls of unplastered caliche. Average diameter, 10 ft. Average depth below present ground level, 12 in. original ground level had been eroded away.

c. Storage niche. Floor of niche was at the level of the bench, 18 in. above room floor. Walls and floor of niche of unplastered caliche.

d. Bench. Around east, north and west sides. Average height, 18 in.; average width, 8 in. Wall below bench faced with slabs; on west side a section of the bench was paved with slabs. Rest of bench was covered with adobe plaster and there were traces of an adobe collar along the edge.

e. Bins. Walls and floors of thin sandstone slabs. Partition slabs ranged from 18 to 27 in. in height. Bins in northeast, southeast and southwest corners had their floors 8 in., 8 in. and 3 in. above the room floor, respectively.

f. Sipapu. Diameter, 6 in.; depth, 6 in. Dug into solid rock floor.

g. Firepit. Diameter, 27 in.; depth, 5 in. Adobe collar 3 in. high on east side.

h. Hole in solid stone floor, 12×15 in.; depth 6 in. Full of white sand.

h′. Hole in caliche floor, 10×14 in.; depth, 2½ in.

i. Deflector. Sandstone slabs standing 12 in. above floor of antechamber.

j. Passageway. Constricted by two stones placed end-to-end on west side. Larger stone, 18 in. long, 10 in. wide, 7 in. thick; smaller stone, 12 in. long, 7 in. wide, 4 in. thick. These stones were on an earthen base that raised their tops 10 in. above floor of the antechamber.

k. Floors. Main room: principally a ledge of solid sandstone, rest of packed caliche. Antechamber: native caliche.

m. Layer of white caliche soil. At the north end of the pit house the original ground level seemed to have been at the top of this layer. At the south end the original ground surface had eroded away.

n. Layer of gray soil that has accumulated since the pit house was abandoned.

● Post-holes. Four in the main room, one in each quadrant. Diameters ranged from 6 to 8 in. Each contained a charred post. Four postholes in the antechamber, one in each quadrant. All contained charred posts 5 to 6 in. in diameter, except the one in northeast quadrant which was very shallow.

Sandstone slabs standing on edge.

Charred beam ends in wall just above the bench. Average interval 13 in.

Stones.

In the spring of 1941, Dr. Deric Nusbaum, of Gila Pueblo, dug extensively in Pit House C, seeking datable charcoal. About one-third of the main room was opened up, and it became evident that certain architectural features were somewhat different from those in Pit House B and were more like those in the pit houses of Step House Cave. A number of potsherds and several problematical clay objects were found.

It seemed unwise to leave the ruin partially excavated, exposing it and the artifacts it still contained to damage by the elements. The preliminary digging indicated that the ruin was in good condition, that it was a dated site giving evidence of adding to the existing information, and that it might be of value as an interpretive exhibit. For these reasons, complete excavation seemed the proper course.

The ruin consisted of a large room and a smaller antechamber, and the principal architectural features fell into the same general pattern as those of Pit House B. There were, however, certain minor variations.

In Pit House B.the original earth surface served as the bench, but in Pit House C the bench was excavated several inches below the original ground level. The original ground level was difficult to establish in the latter ruin, for there had been considerable erosion around the site, especially on the south side. On the north side, the original ground level seemed to have been about the top of the caliche layer, now about one foot below the present surface. At the south end, the earth had been lowered and the original surface had disappeared.

Instead of having plastered walls, Pit House C had its walls, below the bench, faced with slabs of sandstone. On the west side a portion of the top of the bench was paved with slabs. Both the slab walls and the earth walls above the bench were plastered. Another feature present in Pit House C, but missing in Pit House B, was a series of three slab-walled bins, in the northeast, southeast, and southwest corners. These bins were constructed of thin slabs of sandstone standing on edge, and each had a slab floor. The roof supports in these corners were incorporated into the walls of the bins. From each of the posts on the south side of the room, a stone slab extended toward the firepit, again suggesting the southern compartment mentioned above in Pit House B. The slab next to the post in the southeast corner was 16 inches wide and 20 inches high, and had an adobe collar 4 inches high on top. On the north side of this slab had been pasted a small adobe cup, 12 inches above the floor. In outside measurements, it was 6 inches long, 3 inches wide, and 3 inches high. The hollowed-out part was small, however, and would not have held more than a tea cup. The slab next to the post in the southwest corner was 27 inches wide, but had been badly shattered by heat or the falling roof and its height could not be measured.

The roof of Pit House C was probably similar to the one suggested for Pit House B. The same roof supports were present, and the charred ends of some of the side roof poles were still embedded in the wall just above the bench. These side poles were at average intervals of 13 inches.

While the fill in Pit House B consisted of hard red earth, charcoal, and large fragments of burned roof adobe, in C, the fill was soft and consisted of earth with a high ash content. Pieces of burned roof adobe were almost entirely missing.

Nineteen feet northwest of the pit house was a small underground storage room. It was roughly circular with an average diameter of 8 feet, and an average depth of 15 inches. The flat bottom and slanting side walls were lined with sandstone slabs. The roof had burned and there was no evidence of the type of construction.

Pit House B was covered for protection from rain by a wooden shelter erected during excavation; Pit House C, not to be used immediately in the interpretive program, was carefully and thoroughly backfilled after excavation, and normal drainage reestablished.

Artifacts found in the two pit houses were typical of the period. Only articles of clay and stone were preserved. Considerable pottery was found in each ruin, and there were several stone artifacts in Pit House B. Aside from these, the artifacts were limited in number and variety. Practically all of the artifacts in Pit House C, other than pottery, were in a crushed jar on the bench. This jar contained 3 human figurines of clay, 2 nipple-shaped objects of clay, 1 miniature cradle (?) of clay, three polishing stones, one piece of polished hematite, and a small chert chip.

Virtually all the pottery from these sites was typical Modified Basketmaker ware, Lino Gray and Black-on-gray.[8] Only a small percentage of the pottery was decorated.

Most of the black-on-gray is decorated with carbon paint, but specimens decorated with iron paint do occur.

The plain gray ware is crude and variable. The surface color varies from light, chalky gray to almost black. In a few bowls the temper and paste are comparatively fine and well-kneaded, but in most of the vessels the temper is very coarse and the paste irregular and granular. The surface finish of a few vessels is fairly smooth, but, in the majority, is rough and uneven due to the coarse temper and the lack of polish.

[8] The name Lino Black-on-gray has often been used to include iron paint as well as carbon paint Modified Basketmaker painted pottery. Properly, the name probably should be restricted to the carbon-paint form. The only name that has been proposed for the iron-paint, or eastern, form is "La Plata Black-on-white." On the La Plata, Anna Shepard (Morris, *op. cit*, p. 257) found the carbon-paint type predominating north of Pendleton, and iron paint more characteristic south of there.

Some of the Lino Gray appears to be sand-tempered, but the majority is tempered with micaceous grit from a crushed igneous rock, kersenite or biotite andesite. This also predominates in the pottery from the Step House Cave pit houses, and in surface sherds of the period from the mesas. Miss Shepard finds that similar igneous rocks predominate as the aplastic in Modified Basketmaker pottery from the La Plata.[9]

The igneous dikes and blowouts of the Mesa Verde are composed of this rock, and the numerous outcrops probably account for its prevalence as a tempering material. The rock has a high mica content, and the presence of shiny mica particles on the surface of Modified Basketmaker pottery of the Mesa Verde is characteristic. The rock varies in hardness according to the amount of weathering, but much of it is soft enough so that it could be ground easily by the potters.

Vessel walls vary from rather thin to very heavy and thick, both extremes occurring in the same vessel. Fourteen (including painted) virtually complete vessels—eight in Pit House B (of which three were painted) and six in Pit House C—were found crushed under the roof.

In addition to bowls, the plain ware included four varieties of jars: (a) wide-mouthed and globular with no necks, (b) globular with short vertical necks, (c) globular to egg-shaped with recurved rims, (d) large globular jars with the neck blending gradually into the body.

Study of the sherds of the unrestored vessels shows only bowls and jars in evidence. Missing, are such common forms as pitchers, gourd-shaped vessels, bird-shaped vessels, ladles, and handles of all kinds.

The decorated bowls are structurally superiod to the plain vessels. Their temper is less coarse, the surface smoother, and the shapes more regular. The typical Modified Basketmaker designs consist primarily of parallel lines, stepped or zigzag, in pairs, threes, or fours, bisecting the bowl or dividing it in quadrants. Other design elements added are dots, ticks, and open and solid triangles. The paint varies from light rust color to black. Both carbon paint and iron paint occur, the former predominating. Of eight more or less complete vessels found in Pit House B, three are decorated, but of the sherds only 3.3 per cent bear designs; 4.5 per cent of the sherds from Pit House C are decorated.

Two sherds showing basket imprints were found.

Two sherds of well-polished brown ware with black interior, although distinct from Forestdale Smudged or other similar published types, may represent trade from the general region of the White Mountains and the Upper Gila.[10] Several sherds with smudged black interior

[9] Morris, *La Plata* 267.

[10] Cf. John Rinaldo, "Conjectures on the Independent Development of the Mogollon culture," AMERICAN ANTIQUITY VII, p. 7.

but with white exterior similar to Lino Gray possibly represent a local development. This type has been found before, and described in print, but not named.[11]

A single clay pipe or cloud blower was found in Pit House C. It is of the "cigar holder" type, a tapering tube of fired clay. The larger end was hollowed out as a bowl, and a perforation extended through to the small end. The dimensions are: length, $2\frac{3}{8}$ inches; diameter of bowl end, $1\frac{1}{8}$ inches; depth of bowl, 1 inch.

A nipple-shaped object of unbaked clay with hollowed-out base and a fragment of another were found in Pit House C, in the jar found crushed on the bench. The complete specimen somewhat resembles the clay pipe in shape, but it has a wider bowl end and no perforation through to the small end. It bears a punctate design of small holes ($\frac{1}{16}$ inch in diameter) punched into the clay before it hardened. Two holes through one side of the bowl were presumably for suspension. The specimen is $2\frac{1}{8}$ inches long, $1\frac{1}{2}$ inches in diameter at the bowl end; the bowl is $\frac{3}{4}$ inch deep.[12]

Three "figurines" of unbaked clay were found, two from Pit House C and one, with a fragment of another, from Pit House B. They are flat strips of clay $\frac{3}{8}$ inches thick, with irregularities apparently resulting from efforts to reproduce human features, such as noses, breasts, and feet. Morris found similar objects in Mummy Cave in Canyon del Muerto. Two of the specimens are $\frac{3}{4}$ inch wide and $1\frac{3}{8}$–$1\frac{3}{4}$ inches long, the third is $1\frac{1}{8}$ inches wide, $4\frac{7}{8}$ inches long.

An additional object of unfired clay from Pit House C suggests an effigy of a cradle. It is flat and oval, $1\frac{3}{4}$ inches by $1\frac{1}{8}$ inches; $\frac{5}{16}$ inch thick. Attached to one side near one end is a loop of clay, $\frac{7}{8}$ inch in diameter, suggesting the canopy bow of a cradle. The loop bears a punctate design. One of the human figurines found in the same crushed jar fits nicely into the cradle, whether by design or by coincidence.

Two metates in Pit House B, one badly shattered by fire, were made from thick slabs of hard sandstone, with the trough open at one end. Two sandstone manos were found in Pit House B, one in Pit House C. Eight inches long, 4 to 5 inches wide, 1 to $2\frac{1}{2}$ inches thick, each had a single grinding surface, convex in two cases and flat in one. Two badly-

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[11] Cf. Roberts, *Shabik'eschee*, p. 118, also Roberts, *Archeological Remains in the Whitewater District, Eastern Arizona*, Bureau of American Ethnology Bulletin 126, 1940, pp. 48–49. Elsewhere this type has not been separated from the material with brownish exterior such as Forestdale Smudged.

[12] An interesting theory has been advanced to the effect that these objects, familiar in Modified Basket Maker Sites, were effigies of burden-baskets: See E. H. Morris and R. F. Burgh, *Anasazi Basketry*, Carnegie Institute Publication 663, 1941, p. 54.

shattered pot lids, thin sandstone discs, were found in Pit House B. One was found with the two bowls on top of the fallen roof material. Two sandstone slabs from Pit House B, rectangular with rounded corners, 18 inches by 13 and 16 by 14 and an inch thick, may have been cist covers. Three heavy blocks of sandstone, the largest 16 inches by 13 by 3, were found on the floor of Pit House B.

Other stone objects found include: a full-grooved sandstone maul (roughly cylindrical, 8 inches by 4, groove 1 inch by $\frac{1}{8}$); a rubbing stone (waterworn piece of sandstone, $4\frac{1}{2}$ by 4 by $2\frac{1}{2}$), with two convex grinding surfaces; an irregular, battered pebble of igneous rock, roughly spherical, averaging two inches in diameter, evidently used as a hammerstone; five unworked smooth river stones, granite or diorite, such as have been called floor polishers, lap stones, and work stones; three small smooth river pebbles of hard igneous rock resembling pot-polishers; a small wedge-shaped piece of extremely hard hematite with two polished faces.

Only two small charred fragments of textile material were recovered. On the floor of the antechamber of Pit House B was a tiny bit of charred textile woven of two-strand cords, a remnant possibly of a sandal or of a woven bag. On the floor of the main room was a charred stick, 6 inches long and $\frac{3}{4}$ inch in diameter, still retaining its original bark, around which were wrapped a number of pieces of two-strand cord, the ends of which appeared to have been woven together. Associated with this specimen was a handful of charred juniper berries.

Excavation of Pit Houses B and C has strengthened the belief that the Mesa Verde phase of the Modified Basketmaker culture was typical of the period and varied little or none from the normal pattern that has been established for this most important culture. The houses, pottery, and various other artifacts are similar to those that have been revealed in a number of excavations in the surrounding regions.

Further evidence is thus added concerning the agricultural Indians who inhabited the Mesa Verde during the sixth and seventh centuries. They built substantial houses, made crude but serviceable pottery, and had successfully developed other necessary domestic tools and utensils. Of more importance is the fact that they had developed a domestic economy that enabled them to live a completely sedentary life. The establishment of this sedentary culture led to a long period of development, and further excavations will reveal the succeeding cultures that generally built up to the spectacular level attained by the Pueblo Indians of the Mesa Verde region during the 12th and 13th centuries.

Mesa Verde National Park
March, 1942

FIRED CLAY HUMAN FIGURINES IN CENTRAL AND NORTHERN CALIFORNIA

ROBERT F. HEIZER AND RICHARD K. BEARDSLEY

A NEW and significant element was added to the archaeological inventory of California by the discovery, in 1940, of two unique objects of baked clay.[1] These seemed to be fragmentary female figurines but several considerations at the time of discovery called for reserve in this interpretation. Although a well developed baked clay complex is known archaeologically in the Central Valley of California,[2] it had not been evidenced before this time to the west of this stoneless region. Moreover, none of the figurines occurring in this Valley complex represents any part of the human figure; it has been noted, in fact, that aboriginal California in general lacked a tradition of human representation. In addition, these two pieces were fragmentary.

Since that time, however, four similar objects have come to light to allay any doubts that these are schematized human figurines. Two of these objects come from the same area, between Drake's Bay and Tomales Bay north of San Francisco Bay. Neither of these appears to have occurred in a definite archaeological context; one was picked by its owner, A. J. Gambastiani, from an eroded bank near the shore of Drake's Estero, lying in sterile soil, but only about one hundred yards from an historic shell midden, the Estero Site.[3] The second, located in the collections of the University of California Museum of Anthropology, was found in sand dunes near the tip of Tomales Peninsula, apparently without cultural ssociation.

The data accompanying the remaining two figurines, which are the only complete specimens of the six, leave something to be desired. These two, arriving at the American Museum of Natural History as part of a private collection, were taken from a burial in Shasta County, at the northern limit of the Sacramento Valley.[4]

The figurine numbered 1-54291 (one of the two discovered by the University of California Field Party in 1940) was found near the entrance of Tomales Bay without association at a depth of 29 inches, in the upper level of the McClure Site, a stratified shell midden, with two levels, the top level belonging at least in part to the historic period. Figurine 1-54292 occurred also in the top level, in association with a group of 42 shell disc beads (*Olivella biplicata*); these were in a shallow

[1] Fieldwork supported by the Committee on Research, University of California, Berkeley. [2] Heizer, 1937.

[3] For further data on the region and sites see Heizer, 1941.

[4] Information and illustration through the courtesy of N. C. Nelson.

basin of baked earth, one of a joined complex of baked earth basins lying at an average depth of 18 inches. The purpose of these basins has not yet been determined; the presumable reason for this association is the use of this basin for storage or disposal of odd objects.

A brief description of these seven recorded California figurines follows. Measurements in parentheses indicate that the specimen is damaged, and that the figure given is not the original dimension.

Complete specimens:

AMNH #M858: Female figurine, from Shasta County (Pl. XXVI, *b*, *b'*).

Greatest length: 62 mm.
Greatest width: 30 mm.
Average thickness: 12 mm.

Color: buff. Clay has fairly smooth texture, although rough smoothing on the reverse has left slight cracks. The sides taper toward the rounded base; the front appears to taper slightly toward the base. Slight swellings indicate the shoulders; a pinched nodule of clay rises 6 mm. to supply the head. The back shows no modelling nor ornament. Sex is indicated by the conoid swellings on either side of the chest. An irregularly zig-zag line incised between the breasts indicates a necklace; two horizontal incisions, with eight suspended vertical ones apparently represent a grass (?) skirt.

AMNH #M859: Male figurine, from Shasta County (Pl. XXVI, *a*, *a'*).

Greatest length: 53 mm.
Greatest width: 22 mm.
Average thickness: 12 mm.

Color: Brown (and stained?). Clay has slightly rougher texture, and is carelessly smoothed on rear surface. A pyramidal blunt pointed end indicates the head; no modelling shows on the rest of the body, except for the slender nodal protuberance centered at the base to indicate the sex. The base itself is roughly rounded. Roughly wavy incised lines cross the body diagonally, originating at a horizontal incision at the shoulder area to represent, possibly, a rabbit skin cloak. The back is again plain and undecorated.

Fragmentary specimens:

UCMA #1-54291; Female figurine, McClure Site, Marin County (Pl. XXVI, *g*, *g'*).

Head missing; body broken on discovery.
(Greatest length: 40 mm.)
Greatest width: 38.5 mm.
Greatest thickness: 20.3 mm.

Color: Deep brown. Clay is fine grained, smoothed on the surface. Broader in its proportions, it shows definite contraction of the sides terminating in a rounded base, toward which the front also tapers. A slight swelling remains to indicate the shoulder of one side. The back, though now fragmentary, was apparently slightly concave, but without modelling or ornament. The breasts, nodal swellings rising 2.3 mm. from the body, are close together, asymmetrically placed, and connected by a slight rise in the surface. One breast is almost completely broken away. No other details modelled. Ornamentation is made with red ochre, now faded or effaced in some areas. Two narrow stripes, 9 mm. apart, originate at the top left, crossing diagonally downward toward the right side. A

PLATE XXVI: Fired clay figurines from California. *a*, *a'*, Shasta County (AMNH, M-858); *b*, *b'*, Shasta County (AMNH, M-859); *c*, *c'*, Imperial County (UCMA, 1-26736); *d*, *d'*, Marin County (Gambastiani collection); *e*, *e'*, Marin County (UCMA, 1-28142); *f*, *f'*, Marin County (UCMA, 1-54292); *g*, *g'*, Marin County (UCMA, 1-54291).

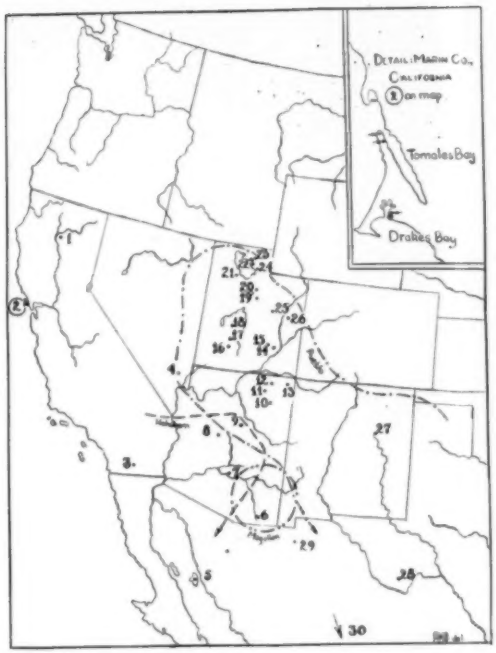

FIG. 23
Distribution of clay figurines in California and the Southwest.

third, higher, appears parallel, meeting the break at the right breast. A near vertical stripe crosses these almost centrally, running from between the breasts to the right side of the base.

UCMA #1-54292: Female figurine, McClure site, Marin County (Pl. XXVI *f*, *f'*).

Head and base missing; left front partly broken away.
(Greatest length: 26 mm.)
Greatest width: 32 mm.
Average thickness: 14 mm.

Color: buff, with red flecks. Clay is gritty, somewhat micaceous, coarse in texture. No modelling shown on the flat back; sides are slightly constricted at a high waist. The single intact breast rises well on the right side as a rounded cone, 3 mm. high. No anatomical details are shown. Decoration is made by straight incised lines or grooves; three horizontal lines run across the front and around the sides. Two (or three) other lines rise vertically from these up the center of the body between the breasts.

KEY TO DISTRIBUTION MAP

Location	Source	Period
1. Shasta Co., California	AMNH, M-858, AMNH, M-859	?
2. Marin Co., Calif. Tomales and Drake's Bay	UCMA, 1-54291, 1-54292, 1-28142; Gambastiani Coll.	?
3. Imperial Co., California	UCMA, 1-26376	?
4. Mesa House, S. Nevada	Hayden, 1930: 81, fig. 13 *d*.	BM III–P III[1]
5. Tiburon Is., Gulf of Calif.	Saville, 1924: 223–225, fig. p. 223	?
6. Dragoon Mts., Arizona	Fulton, 1934a: 18–19; 1934b: 18[2]	Mogollon?
7. Snaketown, Arizona	Haury, 1937: 233–242, Pls. CXCV–CCV	Pioneer-Sedent. Hohokam.
8. Prescott, Arizona	*Ibid.*: 240, Pl. CCVII	P II–III
9. Youngs Canyon, Arizona	Fewkes, 1926: 10–11, Pl. 6–7.	?
10. Keams Canyon, Arizona	Guernsey, 1931: 86–87, Pl. 51 *b*.	BM III
11. Segi Canyon, Arizona	*Ibid.*: Pl. 51 *g*. Renaud, 1929: 507	BM III
12. Monument Valley, Arizona	Renaud, 1929: 507	BM III
13. San Juan area	Morris, 1926; Kidder and Guernsey, 1919: 143	BM III
14. Fremont R., Utah	Morss, 1931: 5–6, 46–50, Pls. 25–28	BM III–P II[1]
15. Wayne Co., Utah	Steward, 1936: 22	BM III–P II[1]
16. Paragonah, Utah	*Ibid, loc. cit.*	do.
17. Beaver, Utah	do.	do.
18. Kanosh, Utah	Steward, 1936: 22; Gillin, 1941: 32	do.
19. Nephi, Utah	Steward, 1936: 22	do.
20. Provo, Utah	*Ibid.: loc. cit.*	do.
21. Grantsville, Utah	do.	do.
22. Warren, Utah	do.	do.
23. Plain City, Utah	do.	do.
24. Willard, Utah	do.	do.
25. Nine Mile Canyon, Utah	Steward, 1933: 8	do.
26. Desolation Canyon, Utah	Gaumer, 1937: 161	BM III (?)
27. Pecos, New Mexico	Kidder, 1932: 133	Glaze V, P IV
28. Brewster, McLennan Co., Eagle Canyon, Texas	Coffin, 1932: 57–58; Bryan, 1930: 84; Crimmins, 1929: 40.	?
29. D-12-6, Chihuahua, Mexico	Sayles, 1936: Pl. XIX	Ramos Phase
30. Mexico, Central America	Vaillant, 1935, 1940; Spinden, 1928: 53–57.	

[1] Peripheral (northern and western) areas with figurine trait probably a survival of Basket Maker complex.

[2] See discussion in Haury, 1937: 241. Figurines are elsewhere absent in the Mogollon culture which is represented in this site (cf. Rinaldo, 1941: 13).

Collection of A. J. Gambastiani, Inverness, California; Female figurine, near Estero Site, Marin County (Pl. XXVI *d*, *d'*).

Head missing; break worn smooth from handling.
(Greatest length: 53 mm.)
Greatest width: 28 m.
Greatest thickness: 16 mm.

Color: reddish brown, smoke blackened along left side. Clay is sandy, slightly micaceous, but smooth on the surface. The body is spatulate shaped, tapering on both sides toward the base, as also from front to back toward the base. The breasts rise 3 mm. as flat topped rounded cones from either side of the body, extending laterally to overlap the sides as well as forward. Nipples are indicated by small punctations. Decoration of three zig-zag lines running vertically down the center and either side of the body are obscured as much by wear as by the coarseness of the clay.

Slight constriction at the break suggests a head similar to the pinched heads of AMNH #M858-9.

UCMA #1-28142; Female figurine, Tomales Peninsula, Marin County (Pl. XXVI *e*, *e'*).

Head missing.
(Greatest length: 72 mm.)
Greatest width: 23 mm.
Greatest thickness: 19 mm.

Color: pinkish red, smoke-blackened on the left front. Clay is rough textured, sandy, with a vermiculated surface from burned out grass fibers. The body is roughly tubular in form, with rounded base, one constriction at the waist and another beginning at the region of the broken head. The figure is slightly bowed forward. Breasts are prominent, and peaked, rising 5 mm. above the body, which is not thickest at the breast region; no anatomical details are shown. There is no decoration.

UCMA #1-26376: Male figurine, cave, Imperial County, California (Pl. XXVI *c*, *c'*).

Head portion missing.
(Greatest length: 60 mm.)
Greatest width: 34 mm.
Average thickness: 13 mm.

Color: gray-tan. Clay is gritty (tempered?), micaceous, hard. Spatulate in outline, tapering to wedge-shaped base. Back and face are flat; body shows rectangular cross section. Genitalia represented by two appliqué pellets, the upper one rising 11 mm. from the body surface.

A number of features appearing on these six figurines are common to the majority or all of them, enabling a tentative description of the type. Predominantly female representations, the average size is about that of the complete female specimen (AMNH #M858). The shape generally includes a rounded base, very slight modelling of contours, except for the definite emphasis of the breasts; other anatomical details are variable. The back is flat, without modelling or decoration, the sides and front recede toward the base. The two complete examples indicate a conventionalized projection to represent the head.

Decoration is used apparently to represent clothing, although schematization is in some cases extreme. One specimen is undecorated, one ornamented with red ochre, and four with incised straight or zigzag lines; the predominant pattern is apparently the use of incision, a trait in keeping with the baked-clay complex of the Sacramento-Delta area. Use of red ochre on one figurine should be noted, first because the intention may have been to represent body painting instead of clothing, second, because it is the only instance known to the authors of color decoration on a baked clay object from central California.

In general terms, the figurines are simple and unelaborate. Appendages are minimized or omitted. Even sex indicators are modelled in the simplest possible manner.

The occurrence in California of these figurines of fired clay immediately suggested to us the problem of their possible relationship to those of the Southwest where figurines are known from many sites and culture levels. Both Kroeber[5] and Loeb,[6] in pointing out possible extra-Californian cultural connections, have looked specifically to the Southwest for origins of certain elements of native central Californian civilization. It seems that our figurines might now be added to their lists of parallels significant in Southwest-California cultural relations. To establish a larger frame of reference, it may be noted here that other authors, notably Vaillant,[7] Haury,[8] and Morss,[9] have proposed an origin of Southwestern figurines in the Archaic horizon of Middle America.[10]

The accompanying map shows a spotty (and probably incomplete) distribution of figurines; the only notable concentrations occur in the northern periphery of the Southwest (Utah), and the San Juan area. Steward[11] and Morss[12] have concluded that the Utah occurrences stem, with other things, from those of the San Juan Basketmaker III horizon. Occurrences in the Anasazi region are uniformly attributable to Basketmaker origin, with the exception of those of Pecos from the Glaze V period.[13]

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[5] Kroeber, 1922, pp. 316, 325; 1925, p. 471; 1928, pp. 382, 293; 1932, pp. 411 ff. See also review of Kroeber, 1932 by Forde, 1933.

[6] Loeb, 1926, pp. 298–299; 1932, pp. 21, 132–134. See also Strong's review (1927) of Loeb, 1926. [7] 1932, pp. 7, 18. [8] 1937, pp. 241–242. [9] 1931, pp. 53–54.

[10] Notes of occasional occurrences (or occasional notes of occurrences?) of fired clay human figurines throughout the United States suggest that they may be one thread of a whole network of northward cultural diffusion from Middle America. See, for example, Holmes, 1903, pp. 41, 101, 157, 183, 184 (NW Georgia; SW Ohio; Cumberland Valley, Turner Mounds, Ohio Valley; Potomac River); Shetrone, 1930, p. 124, figs. 64, 65 (Hamilton Co. Ohio); Ford and Willey, 1940, p. 119, fig. 53 (Louisiana); Cole and Deuel, 1937, pp. 162–163, pl. 34; Moore, 1913, fig. 31 (Louisiana).

[11] 1933, pp. 8–9. [12] 1931, pp. 52–53. [13] Kidder, 1932, pp. 112 ff.

Extending through a longer time continuum are figurines attributable to the Hohokam complex. There is no good evidence of specific connection between the figurine complexes of the Hohokam and Anasazi areas.[14] It seems likely that occurrences in southern California will fit into a peripheral Hohokam context,[14a] as may also be the case of the Tiburon Island (Seri?) occurrence in the Gulf of California.

The lack of conformity to any single type in the six figurines from northern California does not preclude their possible ultimate relation to those of the Southwest, since in both the Hohokam and Anasazi areas no single type predominates. On the one hand, the Hohokam series shows an evolutionary development,[15] and on the other, those of the Northern Periphery seem to represent a later and specialized elaboration of Basket Maker forms. To cite specific resemblances in minor features between Californian and Southwestern examples appears to us to be futile.

On distributional grounds the California figurines are now isolated. Whether examples will be found in the intervening area will await future archaeological investigations south of San Francisco Bay in California, and in Nevada. An archaeological relationship, therefore, remains unproven but potential.

On the ethnographic level we can point to the manufacture of unfired clay dolls by the Pomo[16] and Coast Miwok,[17] but whether these "dolls" may be likened to our fired figurines seems questionable. We have preferred to discuss these figurines simply as items in an archaeological context, rather than to hazard theories as to their function or esoteric significance. Nevertheless, suggestive possibilities are to be seen in Loeb's information regarding the Pomo who made flat clay figures bearing breasts. These were put in cradles and used as a magical means of child-getting. As Loeb points out, a closely similar rite was practiced by the Zuni, Hopi, and Cochiti.[18] Steward's[19] illustration and description of a clay figurine in a cradle from near Torrey, Utah is also of significance here, since he suggests that "figurines were either dolls, used as toys, or were infant effigies carried by women for fertility, whose main feature is sex, as arising from concepts of fertility," though whether a parallel, such as is drawn by Renaud[20] between these relatively un-

[14] Texas occurrences in the Big Bend region may be, but are not certainly, attributable to Anasazi connections.

[14a] Mr. A. E. Treganza has kindly supplied us with information on a number of human figurines from San Diego and Imperial Counties on exhibit in the San Diego Museum. They exhibit the "coffee-bean" eye with horizontal slit, are of male and female form and are generally shaped like a tennis racquet with a broad handle.

[15] Haury, 1937, pp. 238–240, fig. 114. [16] Loeb, 1926: 191, 246–247.

[17] Isabel T. Kelly, Coast Miwok ethnographic notes (in manuscript).

[18] Loeb, 1926: 247.

[19] Steward, 1936: 28–29, Pl. 7. See also Fewkes, 1926: 10–11. [20] Renaud, 1929.

formalized figurines of the New World and the strongly "formalized" cult objects of the Old World is apt, seems open to question.

Although we do not deny the possibility of Morss's statement that "it seems highly probable that the Archaic [Mexico], Basketmaker III, and Fremont figurines are all manifestations of an ancient trait of the "corn-growing complex," it is also evident that similar occurrences in the non-agricultural region of California indicate a less specific association than with a "Maize Goddess," "Mother-Goddess," *et al.*

In conclusion, we offer several possibilities in explanation of the now isolated occurrences of fired clay human figurines in Northern California:[21] (1) they have an independent, local origin referable to a "universal" fertility concept variably expressed according to psychological interpretation; (2) this isolation is more apparent than real—i.e. these figurines are due to an as yet undefined direct diffusion from the south or east. The authors leave the reader to choose between the horns of the dilemma, psychic unity or diffusion.

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[21] It is not necessary even to suppose that the Shasta figurines are historically related to those of the Tomales-Drake's Bay region.

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RECENT DEVELOPMENTS IN THE FUNCTIONAL INTERPRETATION OF ARCHAEOLOGICAL DATA

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IN 1938 Steward and Setzler[1] published a brief plea for a more enlightened interpretation of archaeological materials, calling attention to the necessity for ecological and configurational considerations of material culture complexes. Since that time a number of studies touching upon these features have appeared—enough to constitute a trend. It is the purpose of this paper to analyze these contributions and suggest further possibilities along functional[2] lines.

The past few years have seen the beginning of a general interest in the special theory of interpretation of archaeological data.[3] In the past interpretation was taken much for granted, since the obvious goals of the professional archaeologist were primarily historical, and it was considered that no other possible approach was methodologically feasible. The amateur archaeologist, on the other hand, has tended to preserve an interest in nonhistorical interpretations—that is, he has been interested in inferential reconstructions of the social and ceremonial life of the people responsible for the vanished cultural manifestation.

The term "interpretation" can be roughly defined as the process of applying logical constructs or concepts of historical-functional process to the material remains. Taxonomy in a certain sense is also interpretation, in that it orders the materials in such a way as to delineate similarities and differences, which then permit the archaeologist to extend his historical or functional interpretations to larger groups of data. A recent unfortunate trend has been the acceptance of taxonomic divisions as a goal in themselves, rather than as a tool for historical syntheses. A set of highly rarified concepts of cultural affiliation has grown up around the terminology used to describe the various levels of taxonomic analysis.

American archaeology is still in its intense historical, fact-gathering

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[1] "Function and Configuration in Archaeology." AMERICAN ANTIQUITY, Vol. IV, No. 1.

[2] The term "functional," used throughout this paper, is rather loosely defined as indicating interpretations of artifacts as part of a total cultural scene, integrated within the social, political, and economic organizations, and not merely as unique material objects, devoid of any higher significance. The term "sociological" is occasionally used as synonymous with "functional."

[3] Strong's insistence on the mutual dependence of archaeology and ethnology, for factual and theoretical purposes, probably represented the beginning of this interest; at any rate, it set the pace. (See "Anthropological Theory and Archaeological Fact," in *Essays in Anthropology in Honor of A. L. Kroeber*, Berkeley, 1936.)

stage. All scientific fields have passed through this state—it is usually confined to the earlier years of the development of the discipline, and later gives way to the stage of reflection and generalization. Toward the end of the fact-gathering period, the discipline begins to display a dendritic growth of refined methodologies and attempts at what sociologists call "conceptual integration." With vast quantities of data, i.e., "facts," already on the books, workers in the field experiment with arrangements and orderings of this data, while developing concepts and generalizations *about* the data. If the materials are seen to fall into some regular, repetitive order, this order is generalized as a "law," or principle of continuity.

Another phase of this transitional period is the attempt to standardize terminology and create a technical language that will enable specialists in the field to achieve a high degree of inter-communication. This has been accomplished by the older fields of chemistry, physics, medicine, and the biological sciences (although not to as high a degree as we sometimes believe). Archaeology at present is struggling toward such a special language. That considerable progress has been made is not generally appreciated by many students. The recent series of questionnaires on artifact terminology circulated in the East have done much to clear the air.

American archaeology displays all these characteristics of the later stages of a fact-gathering period. A rash of syntheses and theories of culture development have been offered in the past five years; the taxonomic systems of McKern and Gladwin are only the more prominent. Some investigators have merely applied their systems to their own data—others have drawn upon other sets of data to demonstrate their particular interpretation. An example of the latter type is the recent article by Ford and Willey, with its revealing title: "An Interpretation of the Prehistory of the Eastern United States."[4]

Another characteristic of this period in archaeology has been the broadening of the interest in interpretation, and extension of purely historical considerations to functional or sociological conceptions.

These various approaches, widely diverse in emphasis as they may be, nevertheless involve a basically similar set of concepts: the interpretation of the artifact in ways transcending the ordinary and accepted means. That is, they subsume that "reconstructions" of cultural dynamics from artifacts contain as high a degree of probability as those dealing with purely sequential, typological, or chronological relations.

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[4] *American Anthropologist*, Vol. XLIII, No. 3.

The immediate reaction of many contemporary archaeologists to this type of interpretation is hardly a favorable one. This is because historical reconstructions have been accepted as legitimate goals, and functional comparisons are considered to be too subtle or conjectural to have any real validity. It is only necessary here to point to the extended dispute in the 1920's over the criteria of historical validity, with Kroeber on one side and Boas on the other, in order to demonstrate the once controversial nature of historical studies. Similarly, the statistical method, once discredited, has now become the ultimate modus operandi of American archaeologists. Historical reconstructions based upon careful statistical analysis are now accepted complacently—time has seemed to demonstrate their "validity."

It is hardly necessary to point out that we know as much if not more about comparative social phenomena than we do about the assumptions and criteria of historical reconstruction. Why, then, are functional interpretations in archaeology considered as "tentative" and "conjectural"? Surely it is reasonable to assume that small, briefly-inhabited villages with a degenerate artifact style represent a less-homogeneous culture than a large, long-inhabited pueblo of the same culture complex. This very interpretation has been made recently, in cautious, well-balanced language, as if new and dangerous paths were being trod. Actually this is a logical and entirely plausible interpretation, and probably much more "valid" than many of the supposedly sound historical reconstructions. It is certainly based upon more abundant comparative evidence.

It has been asserted that historical interests are "natural" in archaeology, and constitute the only legitimate and possible sphere of investigation. This can be disproved by citing the various interpretations in European archaeology in the past—some of which were historical, others of which were engaged in reconstructing social life. We must also remember that while American anthropology was entering its historical phase, French anthropology and sociology was undergoing an intense law-making period—the time of Durkheim. The currents of American anthropology in general have shaped the interests of archaeologists rather than the specific subject-matter.

Finally, it is only proper to point out that most amateur archaeologists, particularly the older school, were rarely interested in history and taxonomy. They interpreted their finds as representative of primitive customs and made a real effort to convey the meaning of the artifact within the culture. Crude as some explanations were, they nevertheless betrayed a sincere and sometimes thoughtful attention to the inferential structure of archaeological methodology.

At this point we wish to consider some recent attempts at the ap-

plication of functional concepts to archaeological data, and to show how these fall into roughly four types or spheres of interest.

The first of these approaches involves the application to archaeological data of specific concepts developed by ethnologists and social anthropologists. The data themselves are not strictly interpreted functionally, but rather used to illustrate a functional proposition.

A prominent example of this type of interpretation is the interesting use of Redfield's concept of the "folk society" to explain the nature of small pueblo sites in southern Colorado, by Paul Martin and associates.[5] The sites in question were outlying dwelling units near a large pueblo, and their culture showed a certain degree of degeneration from this large site. Those with the least consistent adherence to the standard pottery styles of the region also displayed the shortest occupation. Since the most general characteristic of a folk society (according to Redfield) is its homogeneity and inner consistency, Martin concludes that the sites showing cultural degeneration were less folk-like, and had experienced some form of breakdown from the parent culture. Thus the pueblo ruins of a district exhibit "cycles of stability and instability."

This conclusion seems to be a reasonable one. The authors have pointed out the relation between degenerate pottery styles and short occupation, and if these correlate, it is logical to assume that the culture has experienced some form of breakdown.

What Martin and Spoehr have really done is to interpret a localized historical development in generalized, or functional terms. The cultural breakdown occurring in these sites in the Ackmen-Lowry area is really a series of historical events—this feature is particularly emphasized by the attention paid to length of occupation of these sites. Since these particular historical events occurred, they might say, the sequence is illustrative of a particular type of cultural change—homogeneous to less homogeneous. The attempt is not really functional archaeology—but rather the application of functional criteria to historical data.

Another example of this type of interpretation is represented by the recent publication issued by the University of Tennessee's new Department of Anthropology,[6] covering part of the vast archaeological

[5] Martin, Lloyd, and Spoehr, *Archaeological Work in the Ackmen-Lowry Area*, Anthropological Series, Field Museum, Vol. XXIII, No. 2. Martin and Rinaldo, *Modified Basket-Maker Sites, Ackmen-Lowry Area*, Same series, Vol. XXIII, No. 3. In this latter publication Martin also includes a carefully-developed functional analysis of the relationships of pit houses to surface dwellings in transitional BM-PI times. In this study he draws upon ethnological evidence and general propositions of folk cultures to demonstrate his point. The conclusions seem reasonable and explicit, and can be taken as a model of the type of work described as desirable later in this paper.

[6] Lewis, T. M. N. and Kneberg, M. *The Prehistory of the Chickamauga Basin, A Preview*, Tennessee Anthropology Papers, No. 1, Knoxville, 1941.

work in the Tennessee Valley by this institution and WPA. In this paper Lewis and Kneberg propose to supplant the present over-simplified genetic sequence of the various so-called Southeastern Woodland cultures by the concept of *acculturation*. Thus they feel that Adena, Hopewellian, and Copena need not be interpreted as having developed in that order, merely because their artifacts seem to represent a simple-to-complex relationship. After pointing out an involved series of cultural relationships, they show that actually these various southeastern Middle Period cultures [our own term] represent a picture of bewildering cross-influences, or acculturation, at one general time period. Thus Adena, Hopewellian, and Copena are different expressions of the same thing, having received different types of influences.

This interpretation goes a long way forward in the application of more sophisticated anthropological concepts to archaeological data, and is to be fully praised. However, there are a number of obscurities in the full use of these concepts which should be discussed.

It is true, as Kneberg and Lewis claim, that the genetic picture of the Hopewellian-derived cultures has been oversimplified, but the authors seem to ignore the fact that stratigraphic ceramic sequences have been developed that show the precedence of Adena over the later Hopewellian cultures. Some of their own data tend to show this sequence.

Secondly, in direct contrast to the advanced and subtle concept of "acculturation" is the simplicistic notion of culture complex, moving as a unit in time and space. For Lewis and Kneberg state, [italics ours]

> The alternative interpretation proposed with regard to the relationships between some of the more advanced cultures and the simpler ones is that they represent an acculturation process rather than an evolutionary or developmental sequence. *This hypothesis presupposes that such cultures as Marksville and Ohio Hopewell attained their special characteristics before arriving in the areas where they have been described* . . . . (p. 37)

This statement confuses and vitiates the acculturation argument, since it implies that "cultures" develop in isolation, free from such disturbances as "acculturation" might bring; then, when they begin to move in space, as units, or "complexes," the process of acculturation is allowed to take place, and the diffusion of traits to other cultures begins. The authors fail to recognize that Marksville and Ohio Hopewell are *already acculturated* complexes, representing a blend of northern and southern characteristics, and their development can be explained without recourse to the unit-complex-moving-in-space-and-time theory. Acculturation is a constant process, and not to be invoked at any given moment.

Both these experiments with archaeological data share a common characteristic: the selecting of some sociological concept and projecting this *upon* the archaeological data. The result has been briefly shown to

be basically the delineation of already-obvious cultural situations, or merely the re-phrasing of historical processes in functional terms. These attempts are amply praised, of course, for the service they render in releasing archaeology from traditionalized procedures.

Dorothy Keur's recent paper, *Big Bead Mesa*,[7] is subtitled "An Archaeological Study of Navajo Acculturation." The study is basically an historical reconstruction of Navajo-Pueblo relations as expressed in material culture, and no attempt at explanation of these relations in sociological terms is given. Despite this, however, the very presence of the term "acculturation" in the title is evidence of a broader outlook. The material offered by Keur is detailed and provocative, and furnishes abundant illustration of the possibilities for more expansive interpretation.

The second type of functional interpretation is closely allied to the one just evaluated, but goes considerably further in re-arranging the data. This consists of the use of materials secured by various investigators, and the re-interpretation and alignment of these according to some specific set of concepts.

One such approach is undergoing an experimental test by Mr. John Adams, of Columbia University. Taking Sorokin's theoretical division of art-forms into "conceptual" and "visualistic,"[8] Adams is considering Maya and Central American painting and sculpture from the standpoint of alternation between these two principles. Thus he re-orders the artistic data in terms of Sorokin's system and thereby evolves a somewhat different outline of cultural inter-influence and development. As an incidental result, Adams achieves an "historical reconstruction," but only in the sense that general lines of culture growth have taken place through time.

A comparable project is under way by Preston Holder and Antonio Waring. They use as data the shell gorgets, copper cut-outs and plaques, pottery decoration, etc., that constitute a striking portion of Middle Mississippi culture in the Southeast. These artifacts display a consistently-recurring series of elements and motifs that seem to be connected with certain ceremonial concepts. These they consider to be evidences of a religious cult that had a wide distribution in late prehistoric and protohistoric times. Holder's and Waring's analysis[9] embraces ethnological data, general sociological concepts of religious organization, and other functional criteria.

[7] Memoirs of the Society for American Archaeology, No. 1.

[8] Pitirim A. Sorokin, *Fluctuations of Forms of Art.*

[9] A preview of this project can be found in Ford and Willey's article, "An Interpretation of the Prehistory of the Eastern United States."

It is evident that this type of functional analysis of archaeological data goes somewhat further than the first examples. Here the data are largely secondary, and instead of functional concepts projected *upon* the material, the materials themselves are re-ordered and seen to adhere to definite structural systems.

A third type of approach that more or less unconsciously utilizes concepts analogous to the two previous examples by Adams and Waring can be found in the recent interest in "ethnohistory." This development is particularly characteristic of the Mississippi Valley but has also been prominent in the Southwest.

In ethnohistory the investigator confines himself largely to documentary source material in order to "explain" or interpret the specific forms of the excavated artifacts. House-construction, pottery-making, mound-building, and other artifact complexes are matched with early ethnohistorical accounts to determine the tribal identity and areal migration of the archaeological manifestation. This type of research is hardly new, having been cultivated by Jacob Brower in Minnesota as early as 1880, under the name of "historico-archaeological deduction."[10]

This general type of investigation, of which Holder's and Waring's work is a specialized, more advanced example, involves the use of anthropological concepts on the essential sociological similarity of all cultures with comparable material culture developments. The gap between the artifact and its use and function in the vanished culture (form *vs.* meaning and use in Linton's sense) is thus bridged by a series of logical inferences concerning the broad resemblance of cultures on a similar artifact level. Considerable progress toward the evolution of a new logic of inferential probability has been accomplished.

A fourth trend is exemplified by the interest in ecological-social-economic correlations revealed by archaeological manifestations in broad geographical areas. Steward's application of this approach to ethnological data in the Great Basin serves as a keynote; Strong's insistence on the mutual dependence of archaeology and ethnology also set the pace.

The most recent expression of this trend is Wedel's analysis of environment and subsistence in the Plains area.[11] In this paper he evaluates the interaction and balance of culture and environment in the determination of subsistence economy, showing how different cultures

[10] Winchell, N. H., et al. "The Aborigines of Minnesota," *Minnesota Historical Society*, 1911, p. x.

[11] *Environment and Native Subsistence Economies in the Central Great Plains*, Smithsonian Miscellaneous Collections, Vol. CI, No. 3.

utilized the environment in different ways. Again this approach is not new, but its specific application to archaeological data is definitely contemporary.

This approach, while not specifically interested in sociological interpretation of the artifact, nevertheless considers the general functional interrelationships of the artifacts (as representative of a cultural whole) and environmental situations.

At this point it might be well to review the problem as far as we have gone. We stated that archaeology is passing through an experimental stage which usually marks the close of the fact-gathering period in any discipline. In the social sciences this period was characterized by an interest in historical studies. Social anthropology has completed the transition; archaeology is just beginning.

The reasons for this transition from specific to generalized statements about archaeological data can be found in the wearing out or exhaustion of the possibilities for interpretation along purely historical-specific lines. Once the temporal sequences in the various areas have been worked out, further contributions on pure chronology and typology become repetitive and somewhat sterile. This situation is rapidly approaching in some areas. It becomes a compulsion on the part of highly-trained anthropologists working as laboratory archaeologists to give their materials more lasting value.

More than that, the accumulation of vast amounts of artifacts has required these laboratory archaeologists to devise complicated techniques for handling them—statistical devices to measure the degree of homogeneity within material culture complexes. The general theory of the type may achieve a new status as a result of some of these investigations. Whiteford's work on the stone and shell artifacts of the Tennessee Valley materials is a case in point.[12]

It would seem natural, therefore, that these workers should see the possibilities in the study of material culture along nonhistorical lines. Some of the processes as well as the mere facts of culture growth may be sounded.

Up to the present, however, these studies have been of a diverse and somewhat diffuse type. What is needed is a consistent, experimental attempt to canalize these various approaches into a system of logical probability that deals with the artifact as a part of the cultural milieu, and susceptible to inferences and "reconstructions" of a functional nature. Such a synthesis might place functional interpretation on a

[12] "Notes on Chipped Stone," *News Letter*, Southeastern Archeological Conference, Vol. II, No. 3, Sept., 1940.

basis of common understanding—the goal of a "community of observers" will have been reached.

It is not proposed here to divorce history and function, but rather to unite the two as a unified concept of culture change through time. Archaeologists dealing with formal change in artifacts, through time, use many unexplicit concepts of functional relationship and culture growth. What is suggested is a system that would explicitly enunciate these principles and place them on a verbal, approachable level.[13]

For example, our evidence regarding ceremonial *vs.* utilitarian artifacts in the Middle Mississippi culture has now reached a point at which we can make a large number of "safe" inferences regarding the social organization of the culture. Ethnohistorical and ethnological data, plus our general knowledge of culture types provides us with sufficient comparative evidence. Therefore it is reasonable to expect that such inferences can be used as "traits" in our comparisons of spatially-separated manifestations. Further, the general cultural sequences in the United States reveal a continually-expanding use of the environmental resources by developing cultures. Surely this information is worth integrating with our general theories of cultural growth and dynamics. It can be regarded as an established fact that a simple hunting culture, as revealed by excavation, was less complex socially, economically, and politically than a large pueblo dwelling or a Middle Mississippi ceremonial center. We believe that such interpretations have a definite practical and theoretical value. As an excellent example, Paul Martin's analysis of the functional variance of pit house and surface dwelling in transitional BM-PI times, may be cited.

At present the archaeologist must be extremely careful and cautious in his inferences regarding the culture of the people whose remains he excavates: actually this represents to a certain degree the complete negation of archaeological endeavor, a sterilization of motive that can only lead to the field being deserted by many of its best workers. The

[13] From a strictly methodological point of view, it would seem that the most fruitful technique in archaeology would be the sociological method known as "constructive typology"—an approach which features the analytical construction of ideal types of social forms and the use of these types as abstract comparative entities, with which to devise an analytical classification of real data. The method is already in implicit use by archaeologists: The concepts of "phase" and "pattern" in the McKern System are really ideal types which may bear no necessary relation to reality in the sense of cultural entities. These do not have to be stated in statistical form, as long as they have utility in generally placing cultures somewhere within the continuum they usually define. Redfield's "folk society" is an ideal type method; it has already been used by Southwestern archaeologists, as this paper has shown. Most archaeologists, consciously or unconsciously, use a variant of this method. It would be well to bring it out into the open.

goal should always be a fair and detailed picture of how these people live; curiously enough, the techniques and logics necessary for such reconstructions have never been developed by American archaeologists.

This is not to suggest that historical studies have no purpose. We merely point out that purely historical studies cannot be depended upon to furnish the meat and drink forever. Certainly the study of material culture deserves more than the endless creation of pottery types.

The orientation of archaeological work along such lines will have many effects other than the direct ones of altering the form and emphasis of published reports. One will be the necessity for archaeologists to overhaul their conceptual machinery in order that they may be equipped to deal with non-historical interests.[14] Such relatively simple approaches as Ford's must be revised to fit more complex conceptions of culture growth. It is difficult to credit a completely unilinear sequence for the eastern United States once we seriously examine the complex principles of culture growth developed by ethnologists and social anthropologists. Moreover, researches by other archaeologists have definitely shown a general cultural development throughout the Mississippi Valley that makes the Marksville, etc., sequence merely one phase in the whole process. It would seem that such expanding interpretations of regional data must be revised to fit both the data from other areas and our more complex conceptual equipment.

Joseph Caldwell, a southeastern archaeologist, has recently suggested that a feasible method for criticising archaeological reports lies in the study and analysis of the concepts a given worker uses in interpreting his data. This suggestion is reaffirmed here. Many of the difficulties in recent historical syntheses (like Ford's and Willey's) can be traced to a failure to adjust one's conceptual structure to the growing complexity of the data. Thus Ford adheres to the same concepts of culture growth he implicitly formulated in the original study of village site collections.[15] Ford's conceptual structure has probably become simpler as his data became more complex. This has been partially necessary in order to allow such complex data to fall into a unilinear sequence.

Another effect of a functional orientation in archaeological studies will be to align the archaeologist with ethnological studies of material culture, and to bring about common understandings and joint methodologies. Few ceramicists read contemporary accounts of pottery-making in primitive groups, yet many obsolete notions of pottery typology

[14] Kluckhohn develops this point in his article, "The Conceptual Structure in Middle American Studies," in *the Maya and their Neighbors*, Appleton-Century, 1940.

[15] *Analysis of Indian Village Site Collections from Louisiana and Mississippi*, Louisiana Department of Conservation, Anthropological Study, No. 2.

might be adjusted if such studies were integrated within the general field of material culture.[16] Similarly such detailed studies of primitive material culture as Osgood's treatise on the Ingalik[17] could be given more contemporary meaning if they had a more general theoretical orientation.

One study exemplifying many of these points is the recent publication by Rouse, on Haitian pottery.[18] As a detailed methodological study, he re-examined and tested his conceptual structure, dealt with generalizations, and also integrated general anthropological concepts with archaeological approaches. It is probably the first comprehensive attempt to formulate a general science of the artifact. As such, it can be considered as a fifth type of functional approach to archaeological data —upon the highest level of generalization. At present it is difficult to evaluate the precise nature of his contribution, since it embraces so many theoretical innovations.

Another result of a functional orientation which might be entirely internal to the discipline will be the growing awareness of archaeologists that their procedures and procedural definitions are essentially relative to the subject matter. That is, such controversies over definitions of the "trait" will be resolved into relativistic, behavioristic definitions that vary according to actual use. There will be a realization that no single definition of such an entity exists—the definition varies according to specific use. Thus a "trait" is not an "item of culture," or a statistically-defined unit, or the lack of an artifact ("negative trait"), but rather all of these, used differently in different levels of analysis. It is a procedural tool, not a phenomenal reality; an essentially linguistic device to describe a particular conceptual orientation toward the archaeological data.

Similar sophistication will come to those who are taxonomically-minded. The curious worship of taxonomy from a terminological standpoint will give way to a more casual use of the method as a tool, and not as a goal in itself. The violent reaction against taxonomy in certain quarters has been a result of the in-group losing sight of the operational utility of taxonomy and over-emphasizing its intriguing psuedo-orderliness. In McKern's various published manifestos on the system[19] these

[16] See, for example, Van De Velde, P. and H. R., *The Black Pottery of Colotepac, Oaxaca, Mexico*, Southwest Museum Papers, No. 13. Also Griffin's review of this paper in AMERICAN ANTIQUITY, Vol. VII, No. 2, pt. 1.

[17] *Ingalik Material Culture*, Yale University Publication in Anthropology, No. 22.

[18] *Prehistory in Haiti*, Yale University Publication in Anthropology, No. 21.

[19] See, for example, his statement in AMERICAN ANTIQUITY, Vol. IV, No. 4, and Colton's use of the principles, expressed in *Prehistoric Culture Units and Their Relationships in Northern Arizona*, Museum of Northern Arizona, Bulletin 17. Colton quotes this statement of McKern's (pp. 6–7), but in his analysis seems to follow none of the procedures.

operational features have been explicitly stated, yet archaeologists have persistently ignored them. This has not been a wilful reaction, but rather the result of a difficulty in understanding the principles of scientific method behind taxonomic techniques.

A new set of premises must be accepted if the archaeologist is to adapt a functional outlook. Perhaps the most fundamental of these is the one concerned with the nature of his data. Archaeological data must be considered as essentially similar to that gathered by any social scientist. The difference is one of degree, not kind. It is often said that the archaeologist deals with only the "material" remains, and that therefore no inferences regarding the behavior of the people can be made. Actually these remains are as good indicators of behavior in many ways as the "customs" dealt with by the ethnologist. Middle Mississippi pottery, with its extreme standardization, division into utilitarian and decorative types, and areal consistency is extremely revealing of the basic dynamisms of the culture as a whole. We only lack the necessary logics to interpret these structural characteristics of material culture complexes. That such principles are in process of formation is evident from the various experimental approaches mentioned in this paper.

University of Chicago
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NOTES ON THE ARCHAEOLOGY OF THE YAMHILL RIVER, WILLAMETTE VALLEY, OREGON

WILLIAM S. LAUGHLIN

IN THE spring of 1941, Dr. W. T. Edmundson, a medical doctor of Newberg, investigating sites along the Yamhill River, located mounds of the same type as those of the Calapuya.[1] With some assistance from Mr. Mark Wald, of Portland, myself, and others, he has now excavated two of these "mound" sites.[2] The objects recovered from the Yamhill River sites exhibit many differences from those of the Calapuya River Mounds. At the period of Caucasian entry the Yamhill Indians spoke a Calapuyan dialect that was different from that of the Indians in the area of the Calapuya River to the south, and were reputed to depend more upon hunting and fishing than the Calapuya proper. The relatively large number of bone and antler objects, the relative absence of large stone work, mortars and pestles in the local collections from the Yamhill area, and numerous fish vertebrae (not found in the Calapuya sites) all indicate the possibility of an archaeological perspective for early historic cultural differences between the Calapuya and Yamhill bands.

Affinities with other cultural areas are indicated by a decorated stone mortar, carved bone head, ear plugs and camas digger handles, reflecting Columbia River and Plateau influences; decorated whalebone clubs, ordinarily regarded as peculiar to the coast of British Columbia, and occasionally found along the Columbia River; and an obsidian blade, characteristic of the Hupa and Yurok of the lower Klamath River.

The Yamhill River is similar to the Calapuya in size and is likewise a tributary of the Willamette, emptying into it on the west bank at a point five miles above Newberg. The two drainage areas are similar in the presence of meandering courses and broad floodplains with many dry washes and oxbows upon which the mounds are situated. An incomplete count of these Yamhill mounds shows that they exist between the towns of Sheridan and Whiteson, although apparently not in as great concentration as those of the Calapuya River.

The largest site yet reported in the Willamette Valley, over five hundred feet in length, lies one-half mile from the Yamhill River.

FULLER MOUND

The Fuller mound is approximately three miles west of Whiteson, and one-quarter of a mile south of the present course of the Yamhill River, on the farm of Mr. G. C. Fuller. To the west of the mound is a large oxbow depression. This remnant of the former stream bed has been

[1] Laughlin, 1941.

[2] For a review of the archaeological sites and remains of the Willamette Valley see Heizer, 1941, pp. 30–31.

partially filled by aggradation of the western portion of the mound. The mound is 39 m. long, 24 m. wide, and 100–150 cm. in depth in the central area. The entire surface of the site has been cultivated. It has no well defined form, but the long axis appears to have been north and south.

Of the two mounds excavated, the Fuller mound yielded fewer artifacts, and contained less fractured rock in the mound mass. Yet the Fuller site contained more artifacts than the Calapuya River mounds previously excavated and produced more broken bones, especially those of deer and elk. Fox, beaver, bird bones, and fish vertebrae were also present. Dissociated and fragmentary human skeletons were found at different places in the mound deposit. One fragment of a burned human skull was found.[3] All the usual characteristics of the local valley mounds were present; fire hearths, bone, ash, chips and rock fragments distributed throughout.

The human skeletal material comes from forty-one burials. All the skeletons were buried on the side in a flexed position with the knees under the chin and hands about the head (Pl. XXVII, *C*). However, there was no uniformity in direction. Wherever a skeleton had come into contact with the clay subsoil, it had disintegrated, often beyond recovery of a single whole bone. Rodents, particularly ground squirrels, had moved many bones and chewed others.

Skeletons No. 1–3 were found in a radius of 120 cm. Skeleton No. 1 was lying on its left side with its head to the south. Skeleton No. 2 lay on its right side with its head to the southeast. All were adolescents and the bones were badly disintegrated. Shells of *Olivella*, *Littorina* and *Dentalium* were found around the legs as well as the neck of these burials. A few bone beads were among them. Skeleton No. 3, that of an adolescent female, lay 100 cm. below the surface oriented to the southwest. The skull exhibited frontal cranial flattening. With the body was a necklace containing seventy-two tubular bone beads (Pl. XXVII, *D*) in addition to shell beads. Three copper bangles and one button were on the necklace, and copper stain was present on the right ulna.

Skeleton No. 4 was a male, with head to the north. Shell beads were present around both the neck and ankles. Although a copper stain was present on the face, no copper objects were found. At the back was found a whalebone club (Pl. XXVII, *E*),[4] with red coloring matter in the engraved, rectanguloid decorations on the handle.

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[3] This cannot be interpreted as evidence of cremation, a burial technique not known in the Willamette Valley.

[4] These decorated whalebone clubs are ordinarily looked upon as peculiar to the coastal British Columbia area. The occurrence of this and other specimens in the Willamette Valley extends the distribution of the type slightly southward and inland. For other examples see Smith, 1907, pp. 403–412.

TABLE I

Burial Associations, Yamhill River, Oregon

Fuller Site

Burial No.	Sex	Flexed	Side	Orientation	Antler artifacts	Leg decorations	Copper objects	Shell beads	Bone beads	Mortar	Pestle	Ear plugs	Flattening	Cephalic index
1		X	L	S		X		X	X					
2		X	R	SE		X		X	X					
3	F	X	R	SW		X	X	X	X				X	
4	M	X	L	N		X		X						84.5
5	F	X	L	N					X					74.
6	F	X	L	SW	X									
7				SE										
8	M	X					X	X						87.
9	F	X	L	SW										84.7
10	F	X	L	W	X	X	X	X	X				X	
11	F			N										89.4
12	F	X	R	(N X W)	W			X						82.3
13	F	X	L	NW		X		X	X					79.2
14	M	X	L											81.
15	F		R		X									80.4
16	I													
17														
18	C		R					X						
19	M		L											76.5
20	M		R		X							X		83.8
21	M		R		X							X		81.7
22	I													
23	I													
24			R											74.
25	F		L					X						84.2
26	F		L		X			X						81.3
27	I		R											
28	F		R											83.
29	C		L											
30	M													
31	M													
32	I													
33	M		L											
34			L											
35			L											
36	F		L					X						
37														
38														
39	F		R		X		X	X						79.1
40	M		R		X	X	X	X			X		X	
41														

Fanning Site

Burial No.	Sex	Flexed	Side	Orientation	Antler artifacts	Leg decorations	Copper objects	Shell beads	Bone beads	Mortar	Pestle	Flattening	Cephalic index
1		X											
2	F	X	L	NW									80.5
3	M	X	L	NE				X	X				74.5
4	M	X	R	NW						X			
5	M	X	L	N									85.3
6	M	X	L	NE	X							X	
7	F	X	B	NW							X		86.3
8	C												
9													
10													
11													
12	M										X		
13	M												
14													
15													
16													
17													
18										X			83.5

Skeleton No. 10 was of an adult female. The head was to the west, and the skeleton lay in the customary flexed position on the left side (Pl. XXVII, *C*). The skull was slightly deformed, frontally and occipitally. Although now having an index of 82.9, it was identified by Drs. A. Hrdlička and T. D. Stewart as having belonged, prior to deformation, to a dolichocephalic type similar to the "Shoshonean" type. Behind the

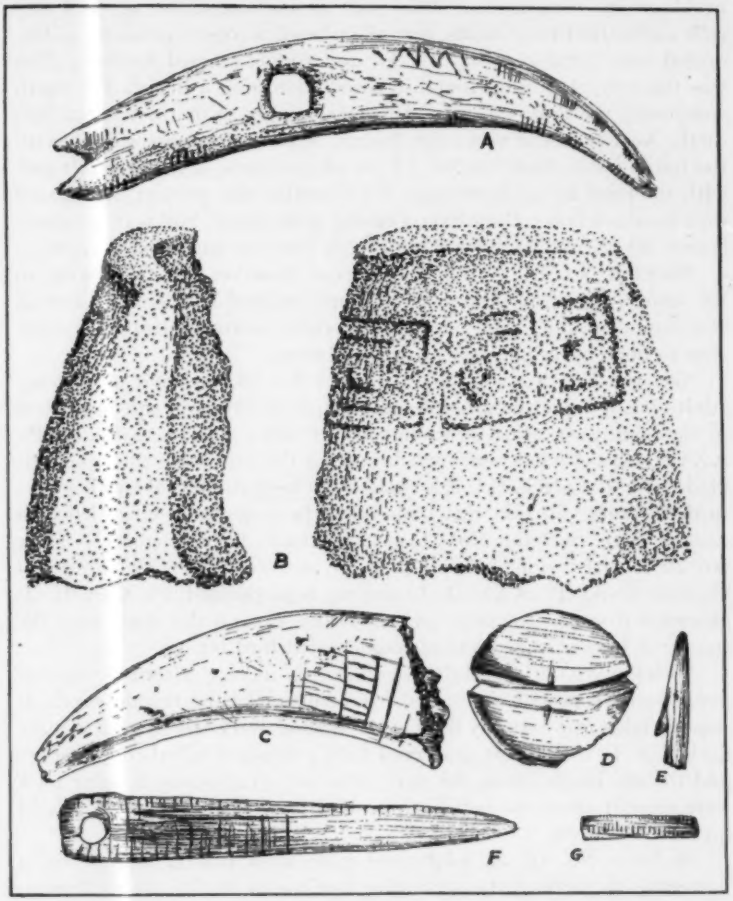


FIG. 24.—Artifacts of the Yamhill River, Oregon. *A*, decorated camas digger handle; *B*, rim fragment of decorated mortar; *C*, incised antler; *D*, sinker with equatorial V-shaped groove; *E*, barbed fish spear point; *F*, perforated bone pendant; and *G*, decorated bone bead.

head was a well decorated antler camas digger handle (Pl. XXVIII, *A*, Fig. 24, *A*).[5] Beads were present around the neck and ankles. The

[5] Cf. Smith, 1910, Fig. 126.

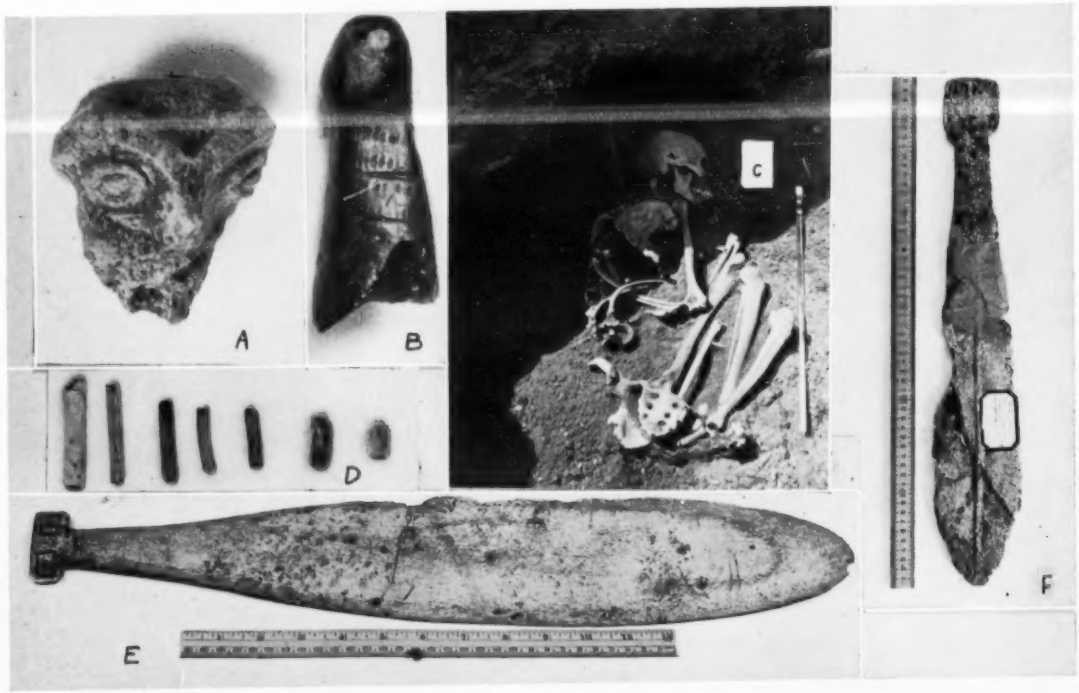
necklace was composed of *Pelecypod*, *Dentalium*, *Littorina*, and *Olivella* shells, bird bone beads, one glass bead, a copper pendant, a decorated bone pendant (Fig. 24, *F*), and copper-stained feathers. This was the only glass bead found in association with a burial. The earth composing the grave-fill was of a finer texture than the surrounding earth. Near the head was a fire hearth, apparently in association with the burial itself. Skeleton No. 13, an adult female, lay on the left side with the head to the northwest. No mandible was present. Associated were beads of bone, *Dentalium*, *Olivella*, and *Acmae*. Soil texture above burials No. 12 and 13 differed noticeably from the surrounding earth.

Skeleton No. 18, a young adolescent, deserves mention owing to the association of an ornament of copper-stained feathers and strings of 2 mm., dentalium shell beads at the right auditory meatus, in addition to fibers of cedar bark about the burial.

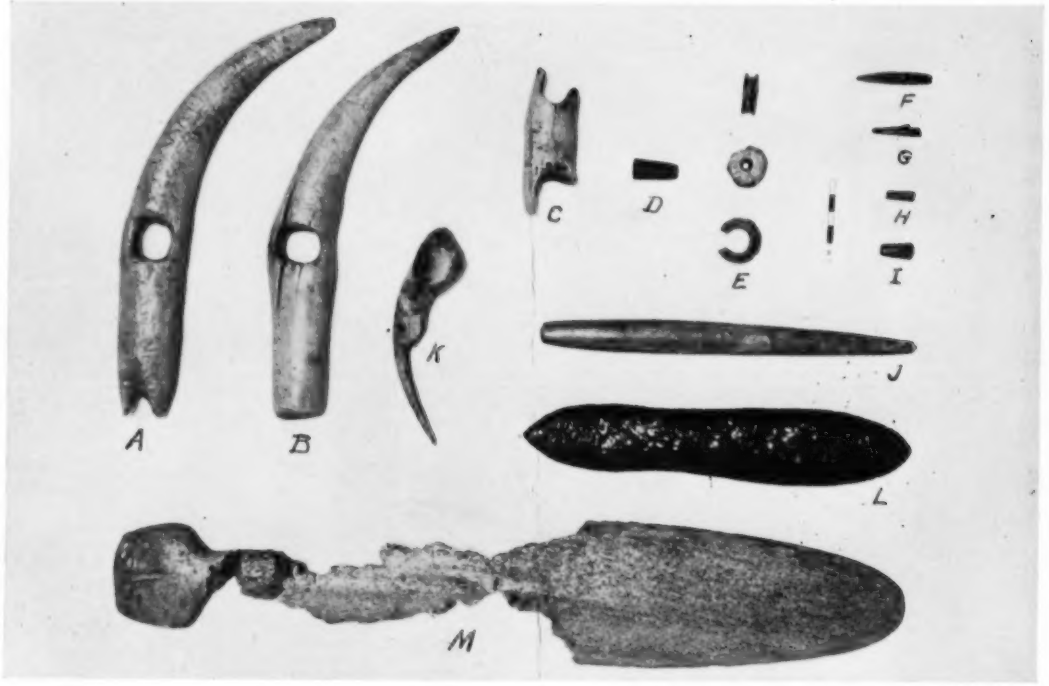
Skeleton No. 20, lying directly under No. 18, was that of a young adult male lying in the usual flexed position on the right side with head to the southwest. Antler earplugs lay at either side of the skull (Pl. XXVIII, *E*). A whalebone club lay along the back with the tip of the blade near the pelvis (Pl. XXVIII, *M*). The entire burial had been intruded one foot into the clay underlying the mound and was filled with mound earth. Skeleton No. 21, an adult male, lay immediately under No. 20. At either side of the skull was an antler earplug. One variegated obsidian blade (Pl. XXVIII, *L*) and one bone poniard (Pl. XXVIII, *J*) extended from the knees to the shoulders. Behind the skull were the fractured jaws of a dog and an unidentified bird bill.

Skeleton No. 39, an adult female, lay on its face, although this unusual position probably resulted from shifting of the mound earth. It was intruded into the clay floor of the mound and covered with a loose, dark clay. Feathers were preserved with a string of rolled copper tubes and *Olivella* beads about the right shoulder. Fragments of cedar bark were present about the pelvis. A camas digger handle (Pl. XXVIII, *B*) lay near the head.

Skeleton No. 40, an adolescent male with frontal and occipital flattening, is particularly interesting because of its *Olivella* shell ornaments. It lay close to the base of the mound in a loose earth fill. Above the skull was a large hearth in the ash of which was a pestle, 25 cm. long, oval in cross section and fractured into four pieces. A rotted cedar post extended from near the surface down to the burial. Cedar fragments surrounded the skeleton. On one side, the remains of several vertical planks formed a wall over 26 cm. long. The *Olivella* beads were unusually uniform in size and lacked the common chalky appearance. A few *Olivella* beads were present about the right shoulder and about the pelvis. Three



Yamhill River, Oregon. *A*, carved bone head (Fanning site); *B*, incised bone; *C*, burial No. 10 (Fuller site); *D*, tubular bone beads (Fuller site); *E*, whalebone club (Fuller site); *F*, whalebone club, Oregon State College Museum.



A, *B*, camas digger handles; *C*, fragment of double-holed handle; *D*, tubular pipe; *E*, antler ear plugs; *F*, grooved barb for fish gig; *G*, harpoon point; *H*, piece of incised bone; *I*, bone pendant; *J*, bone poniard; *K*, bone, possibly used in weaving basketry; *L*, obsidian blade; *M*, whalebone club. (*A*, *B*, *E*, *J*, *K*, *L*, *M*, Fuller site; *C*, *D*, *F*, *G*, *H*, *I*, Fanning site.)

rows of *Olivella* beads decorated each ankle and a row extended up each fibula to its head where two rows passed around each leg. About the right wrist was a string of *Olivella*, *Dentalium*, and copper beads. On each foot were *Dentalium* beads, small *Olivellas* and a tube of iron 1 cm. × 1 cm. A piece of iron, round in cross section, was in each nasal aperature. In the right hand lay a corroded fragment of square, flat iron, probably a knife.

A number of dissociated flaking tools, usually tips of antlers, were found. In cross section they were most commonly round, flat or triangular and a few had been fashioned by whittling rather than by grinding. Other odd pieces of decorated antler and bird bone were not uncommon (Fig. 24, *C*). A penis bone, possibly of a bear, with two flattened surfaces at the base, also occurred at this site. Camas digger handles and fragments were numerous. Black obsidian, variegated obsidian, jasper, chert and chalcedony were common materials used for projectile points. Fifty-two per cent of the arrow points examined were of the type SAa, and twenty-one per cent, the next largest group, were SAb.[6] The third largest group were of type SBa and the fourth largest of type SCb2. Large points were quite rare. The majority of the arrow points were over 100 cm. above the base of the mound. Other than pestle and mortar fragments the only ground stone artifacts were sinkers 2.5 cm. to 4.5 cm. long, with a ground "V" groove (Fig. 24, *D*), always found within 50 cm. of the surface, and never associated with burials.

Identified shells are *Littorina* sp.?, *Olivella boetica*, *Olivella biplicata*, *Paphia staminea*, *Turitella* sp?, *Dentalium* and *Acmae metra*. These shells did not occur near the bottom of the mound except when associated with burials. Shells of a river mussel (a source of food) were common throughout the mound.

Caucasian-made articles, such as copper and a button, were found only near the surface except when associated with intrusive burials, which were sometimes recognized by the soft grave fill. One lead ball was recovered from the surface.

FANNING MOUND

Six miles up the Yamhill River beyond the Fuller mound is a larger and even richer site on the farm of Mr. B. G. Fanning. This site is 61 m. long, 38 m. wide, 150 cm. in depth in the central area, and lies with the long axis northeast and southwest. It is situated on a terrace about one hundred yards from the present course of the Yamhill River. During wet seasons the low area between the river and the terrace upon which the mound is built is flooded. On one-half of the mound are large maple

[6] Strong, 1935, pp. 88–89.

fish gig; *G*, harpoon point; *H*, piece of incised bone; *I*, bone pendant; *J*, bone poniard; *K*, bone, possibly used in weaving basketry; *L*, obsidian blade; *M*, whalebone club. (*A*, *B*, *E*, *J*, *K*, *L*, *M*, Fuller site; *C*, *D*, *F*, *G*, *H*, *I*, Fanning site.)

trees from three to seven feet in diameter, the other half is part of a wheat field. The deposit of this site is darker, of finer texture and screens more easily than that of the Fuller site. In general there were more arrow points and more ground stonework.

The skeletal remains consist of eighteen skeletons, the greater portion of which were fragmentary. Of those in at least a fair state of preservation skeleton No. 4 presents an interesting association. A male, it lay on the right side, with head northwest-by-west. Although the legs were in the usual flexed position, the arms were extended at the elbow. At the knees was a "killed" mortar, broken in half. Also near the knees was a small stone bowl with a shallow, oval basin. The surface of the basin showed no grinding. It is outwardly similar to some lamp-forms of the Aleut and of the Alaskan Indians. Other similar specimens are contained in a private collection in this same area.

Skeleton No. 5 was that of a male. It lay with head to the north on its left side. Associated with it was a nicely carved head of bone (Pl. XXVII, *A*).[7] Very little remained of skeleton No. 6, a large male adult. This burial was surrounded by ash. Associated with it were the bones of an infant, skeleton No. 9, probably but a few months old.

Skeleton No. 7 presented the first real difference in method of burial. It was an adult female lying with head northwest-by-west. Instead of lying in the customary flexed position on the side, it lay in a flexed position on the back. In the left hand was a well polished phallic pestle with its head in place of the missing lower mandible. A fire hearth was near the head of this burial.

There were many bone and antler objects in the mound mass. The most common were broken tips of flaking tools made from antler tines. Other similar finds included wedges of antler, bone awls and antler camas digger handles. A new type of decoration was found on the charred fragment of what may be a human metacarpal (Pl. XXVII, *B*). Also of interest was a single-barb bone harpoon or fish spear point (Fig. 24, *E*, Pl. XXVIII, *G*). Related finds were a bone harpoon collar, a grooved barb for a fish gig or toggle head (Pl. XXVIII, *F*) and a bone projectile point. This type of harpoon collar is common to the Columbia River whereas the projectile point is similar to those found commonly along the southwestern coast of Oregon. Three of the bone beads were decorated with a series of transverse incisions (Pl. XXVII, *D*). Another bone piece with four flat surfaces, nine incised dots on one side and twelve

[7] This carved head is decidedly reminiscent of the late style of bone carving found by Strong, Schenk and Steward in the Dalles Region. Bone carvings from the Dalles were incised on flat pieces of bone. In late times this art may have diffused southward into the Willamette Valley.

on another, is suggestive of a gambling piece (Pl. XXVIII, *H*). One small bone pendant, well polished, with a hole for suspension was found near the surface (Pl. XXVIII, *I*). Chipped work was more common in this mound. Of five hundred arrow points examined, twenty-eight per cent were of type SAa, thirteen per cent were of type SAb, thirteen per cent of type SCb2 and eight per cent were of type SBa. Materials used are the same as those of the Fuller mound, obsidian, occurring in water-worn pebbles throughout the mound, again being the most common. Many scrapers, drills and knives were also found. Ten grooved sinkers recovered from this site lay within 50 cm. of the surface. One of the mortar fragments had an unusual design (Fig. 24, *B*). Another hitherto unreported piece was a small tubular stone pipe (Pl. XXVIII, *D*), and a fragment of a larger one.[8]

The shell beads found in this mound were of the same species and types as those of the Fuller mound, with the exception of an abalone (*Haliotis*) pendant found near the surface.

Three glass beads and a few pieces of copper were found near the surface. A few fragments of porcelain found on the surface may or may not have been used by the Indians.

CONCLUSIONS

Special mention should be made of the new finds: shell decorations on the legs, a barbed fish spear point, the large number of decorated pieces such as the camas digger handles, whalebone clubs, figurine head, grooved sinkers, tubular pipe, earplugs, obsidian ceremonial blade, bone poniard, nasal decorations and the quantity of bone fragments.

Three of the skeletons with artificially deformed skulls had associated articles that gave evidence of their being late or post-white burials. Other artificially deformed skulls from the valley that have been brought to our attention have all been associated with evidence indicating them to be late burials. At least two physical types appear to be represented in the skeletons, and examination may reveal more.

In general, the majority of the arrow points and all the sinkers were found within 50 cm. of the surface in both mounds. The most finely worked arrow points were those more than 50 cm. below the surface. Arrow points on or near the surface were comparatively crude, while those on and near the bottom were of medium workmanship. As a whole the arrow points were small and large points were quite uncommon. The

[8] Pipes are reported from the Willamette Valley (Heizer, 1941), and occur rarely in private collections made in the vicinity of the Calapuya River, middle Willamette region.

grooved sinkers which may have been used either as bolas weights or net sinkers are in keeping with the comparatively large number of bird, animal and fishbone. The larger amount of the bone occurred in the lower portion of the mound while very few pieces occurred above the arrow points. All the 20-odd camas digger handles, with the exception of those associated with intrusive burials, were found near the surface. One of the camas digger handles had a knob on the small end. In this respect it was similar to camas digger handles from Sauvie's Island, in the Columbia River near Portland, Oregon, many of which have from one to five knobs carved on the small end. No digging stick handles were found by Strong in the Dalles region. Eight were found in excavations of the Upper Columbia region.[9] Many imported marine shells were found but only the local river mussel was found in the lower part of the sites. There appeared to be no stratification of burials nor preferred orientation. All were buried in the flexed position and all, with the exception of one, lay on their sides.

The whalebone club associated with skeleton No. 20 differs materially from the one associated with skeleton No. 4, also of the Fuller site. In addition to a generally heavier construction and face decoration on the handle, a median keel runs the length of either face of the blade. The eyes and beak carved in relief on the handle are not duplicated in any other club previously reported. A similar whalebone club in the Oregon State College Museum (Pl. XXVII, *F*), found in the Willamette Valley approximately sixty miles south of the Fanning site is decorated with a face on the handle that is recessed rather than raised and has a keel running down one side of the blade.

Burials No. 20 and 21 of the Fuller site throw some light upon the "labrets" or "earplugs" also reported by Strong, Schenk and Steward. The presence of the antler discs at the auditory meatuses of these two burials indicates their usage as earplugs rather than as labrets.

The occurrence of the obsidian blade with skeleton No. 21 represents a northward extension of this trait previously reported by L. S. Cressman at the Gold Hill burial site, approximately two hundred miles to the south.[10] These blades are characteristic of the Hupa and Yurok of the lower Klamath River. This specimen possesses good symmetry and displays fine workmanship in its chipping.

It is difficult, even hazardous, to draw any far-reaching conclusions on the basis of such a small number of burials and artifacts from only two sites. Definite Columbia River and Plateau influences were felt on the Yamhill River as evidenced by the decorated stone mortar, carved

[9] Collier, Hudson and Ford, 1942, pp. 82–84.

[10] Cressman, 1933.

bone head, earplugs and camas digger handles. It seems clear that these northern traits were registered late, probably not earlier than the late eighteenth century, at which time began the great shifting of the contact period set in motion by Caucasian impact, fur trade, introduction of the horse, etc. The culture displayed by archaeology lacks the richness and variety previously reported for the Dalles region,[11] though this latter may also be rather late. Frontal cranial deformation ("Chinook" type) is not typical for the area until historic times, an observation confirmed by the burials described here.

It is hoped that local institutions will encourage research in the Willamette Valley, an area of abundant sites which promise fair returns. Historic material derived from whites *indirectly* (the first Caucasians did not enter the valley until the first decade of the nineteenth century) promises excellent protohistoric data which will be an aid in determining native culture forms in the period before primary and violent white contact, with attendant extermination, caused the decline of the Calapuyan people and civilization.

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Cave Junction, Oregon
April, 1942

[11] Strong, Schenk and Steward, 1930.

EDGAR BILLINGS HOWARD, 1887–1943

J. ALDEN MASON

EDGAR B. HOWARD died at San Diego, California, March 18, 1943. His death occurred, as he doubtless would have wished, while he was at work for his country at his post in the Engineering Department of the Consolidated Aircraft Corporation. Having failed, because of the condition of his heart, to receive the army appointment to active service that he had sought, in September he removed with his family to La Jolla, California, so that he might both engage in defense work and be close to ancient archaeological sites. In his death American archaeology loses a sound, enthusiastic, and thorough student, Philadelphia an unusually public-spirited citizen, his family a beloved husband and father, and his colleagues a loyal, cheerful, admired, and lovable friend.

Though born in New Orleans February 28, 1887, the son of Frank Turner and Emma Cora Howard, Edgar Howard passed his adult years in the Philadelphia region, making his home in Bryn Mawr. On October 1, 1910, he married Elizabeth Newhall, who, with five sons, four of whom are now in their country's service, survives him.

After preparation at St. Paul's School he attended Yale University and graduated with the degree of Ph.B. from the Sheffield Scientific School in 1909. After a few years in business he served his country as Captain in the 313th Infantry during the First World War. He saw active service overseas and was made Liaison Officer, owing to his knowledge of French. His fellow officers and men loved and admired him, remarking that he would never send a man where he would not go himself. After the war he again engaged in business until 1928 when he retired to devote himself to scientific research. From that time on, his primary interests were in archaeology, geology, and paleontology. He received his M.A. degree in the Department of Anthropology at the University of Pennsylvania in 1930 and his Doctorate in the Department of Geology in 1935. His thesis on Early Man in North America was published by the University Museum (see bibliography). For several years his major interest varied between archaeology and paleontology, but finally centered in the problem on which the two sciences most closely collaborate, that of most ancient man; in this field he limited his studies to America and contiguous Asia.

Dr. Howard was connected with several different institutions and in all of them he took a prominent part in planning policies and activities. From 1934 on, he was Research Associate of the Carnegie Institution of Washington, and since 1939, Research Associate of the Laboratory of Anthropology at Santa Fe. His most active associations,

however, were with the Academy of Natural Sciences of Philadelphia, the Department of Earth Sciences of the University of Pennsylvania, and the University Museum.

He took a great interest in the affairs of the Department of Earth Sciences during his close association there. In 1938, at his instigation, a joint committee of the Department and of the Academy of Natural Sciences was formed for the purpose of cooperation between these organizations and for the expansion and improvement of the Department and the reorganization of its curriculum. Dr. Howard was secretary of this committee. As a result of its recommendations the name of the Department was changed from "Geology and Mineralogy" to "Earth Sciences," and the present four-year course in the earth sciences was established. Dr. Howard was appointed Special Lecturer in Paleontology and for one year gave lectures on the evolution of man and in the field of vertebrate paleontology.

Dr. Howard became a member of the Academy of Natural Sciences of Philadelphia in 1924, was appointed Research Associate in 1931, and was elected to the Board of Trustees in 1935; he resigned from the latter position in 1938. In 1936 he was appointed Acting Curator of the Department of Geology and Paleontology and for several years maintained his personal office at the Academy. During his association with the Academy he conducted a number of expeditions to the southwestern states in search of early man and his association with extinct fauna. Some of these expeditions were financed entirely by the Academy, others jointly with the University Museum.

One of Howard's most important accomplishments during his association with the Academy of Natural Sciences was the organization of the International Symposium on Early Man, held at the Academy March 17–20, 1937, in connection with the celebration of the Academy's 125th Anniversary. The idea was his, and he was appointed Secretary of the organizing committee. The symposium was one of the most outstanding and successful of its kind ever held in this country, with authorities from all over the world attending and reading papers. Thirty-six of these were later collected and published under the title "Early Man" (Philadelphia, 1937). It is characteristic of Edgar Howard's modesty that, though he was the moving spirit and organizer, he did not contribute an article on his own investigations to appear in this outstanding work. But he is seen at work in the anonymous frontispiece.

Dr. Howard became a Research Associate of the University Museum in 1929 and held this position until 1942 when he was made Research Fellow. He always took a lively interest in the activities of the

Museum, and during the last years of his life almost all his interests centered there. He conducted several expeditions for the Museum. He was instrumental in having the University Museum set aside a sum of money for grants-in-aid for research on early man in America and headed the committee for the allocation of such grants. Only a few months before his death he was elected Vice-Director. His cheerful personality and wise counsel will be greatly missed by his colleagues.

His civic and philanthropic activities played a large part in Dr. Howard's life, but one of course slightly known to his archaeological colleagues. He took his public obligations as conscientiously as his scientific ones. Throughout his life, as a trustee, he took a great interest in the welfare of the Howard Memorial Library in New Orleans, founded by his grandfather. He served for a number of years as a member of the Radnor Township Board of School Directors, part of this time as President of the Board. He was also a member of the Boards of Directors or Trustees of several Philadelphia hospitals and other philanthropic institutions. For more than a year he was head of the Philadelphia Committee for the Care of European Children, an activity that occupied almost all his time, to the detriment of his scientific research. He was an honorary member of the First City Troop of Philadelphia.

Dr. Howard belonged to Delta Psi and to Sigma Xi fraternities, to the Boston Club of New Orleans and the Yale Club of Philadelphia. He was a member of most of the national anthropological societies and of several local ones in the East and Southwest. In 1938 he was president of the Society for American Archaeology.

By limiting his interests and activities strictly to one comprehensive topic Dr. Howard rapidly became one of the foremost authorities in the field of earliest man in America. From 1929 to 1935 inclusive he conducted excavations in New Mexico and Texas, his most important work being at Burnet Cave and at Clovis. In 1938 he added Nebraska and Saskatchewan to his itinerary, and in 1941 excavated in Wyoming. For the purpose of studying archaeological objects from eastern Siberia that might resemble American material he visited Russia in 1935. Probably no other archaeologist working in this field had such a good background in geology and paleontology, or such wide acquaintance with specialists in these lines. He stressed the necessity of collaboration between archaeology and these other sciences in the solution of problems. He always conducted his excavations in collaboration with some geologist, and his reports were frequently published jointly with a geologist.

An outstanding characteristic of Dr. Howard's scientific approach was that he was not satisfied merely to obtain new evidence on some

moot point and to record it properly. He spent much thought and effort on the problem of making it quickly useful, that is, of having it, along with other increments of factual knowledge, considered and adjudicated by his colleagues. One of his chief aims, which is not very apparent in his publications, was to reduce the area of controversy by frequent conferences and by cooperative planning of field studies. Had he lived, after the war he would undoubtedly have attempted to establish some sort of clearing-house for the exchange of information and of specialized assistance in matters relating to the problem of early man in America.

Another facet of his character known to only a few friends was a readiness to go far out of his way in helping and encouraging younger men to come into his field.

Friendliness, modesty, and an ability to work with others were among Edgar Howard's outstanding personal characteristics. In his scientific work he was thorough and conservative. His death is a great loss to American archaeology.

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CHARLES CLARK WILLOUGHBY, 1857–1943

EARNEST A. HOOTON

CHARLES CLARK WILLOUGHBY was born at Winchendon, Mass., July 5, 1857, and died at Watertown, Mass., on April 21, 1943. He was the son of a farmer and descended from Deputy Governor Francis Willoughby (1665–70) in whom he took some interest. As a young man he went to Augusta, Maine, and clerked in a drug store. Soon he opened an art store in which original works were sold, as well as reproductions of celebrated paintings, This store was the first in its vicinity, and, under the influence of Willoughby, the young people of Augusta began to collect photographs of Madonnas and other works of art.

While in Augusta, Mr. Willoughby had two hobbies. The first of these was marquetry work. He made beautiful inlays in furniture and small picture frames, following his own designs. He also began archaeological excavations in the shell heaps of Damariscotta and elsewhere.

In 1883 he married Margaret Elizabeth Stanwood, whose father was the first city clerk of Augusta, a major in the state militia, and a leader in musical circles. Mrs. Willoughby was a cousin of the wife of James G. Blaine. Her brother was Edward Stanwood, the historian. The Willoughbys had a summer home on Squirrel Island near that of Stanwood and came into contact with Nelson Dingley, William P. Frye and other national figures.

Sometime prior to 1892 Professor Frederick Ward Putnam of the Peabody Museum of Harvard University became acquainted with Willoughby through the latter's archaeological interests. Putnam persuaded him to abandon his prosperous art business and in 1892 Mr. Willoughby became Assistant in the Department of Anthropology at the Chicago Exposition—one of Putnam's projects. At the close of the Fair, Willoughby came to the Peabody Museum of Harvard University, where he was chief assistant, 1894–99, assistant curator 1899–1913, assistant director 1913–15, director 1915–28, and director emeritus until his death. His connection with the Peabody Museum thus covered a half century.

Mr. Willoughby was passionately devoted to the institution that he served so long. His particular interest was the care and installation of specimens. He was perhaps the foremost authority in the country on the identification of ethnological objects from all parts of the world. He was a pioneer in the devising of new methods of restoring and pre-

serving specimens and indefatigable in his extermination of museum pests (insect).

With a ridiculously small budget he gradually built up the museum collections, cased the new halls in the addition that was built in 1913 to connect the old Peabody building with the University Museum, and installed exhibits himself, with the help only of Mr. S. J. Guernsey. He reorganized the storage system, established an excellent photographic collection, dug up from the files of old field notes the reports of various archaeological expeditions sent out under Putnam, edited them, and published them.

With his limited funds, he nevertheless managed to appropriate small amounts for various archaeological projects in different parts of New England.

Willoughby was an artist. He began the series of exquisite small scale ethnographical models that are one of the most useful and attractive exhibits in the Museum and were later developed and made famous by Guernsey and Pitman. He illustrated his archaeological reports with his own beautiful and meticulous drawings.

Mr. Willoughby was essentially a museum and specimen man and was not particularly interested in the teaching of anthropology, although he served as Austin teaching fellow from 1899–1901. He was most reluctant to give students manual access to his precious collections, but, when once convinced of their seriousness and competency, he was generous with his time and his knowledge in lending them assistance. He had little use for theory and for teachers who dealt with words and neglected specimens. If you got into a laboratory coat, washed, mended and catalogued specimens, and then installed them satisfactorily, you ceased to be reckoned among "the ornamental young men on the office staircase."

During my first years at the Museum (from 1913 to about 1920) I was paid a few hundred dollars annually to work upon the skeletal collections of the Museum, in order to eke out my stipend as a Harvard instructor. Thus I experienced Mr. Willoughby in his capacity as a director of curatorial work. He was severe and exacting, but generous in his appreciation of work that he judged to be well done. He could be formidable when dissatisfied. His wrath was awful.

One day I was standing on some moveable steps in the storage stacks, removing from the top of a case a wooden tray tightly packed with nested Predynastic pots. The steps tipped over and the pots and I came down. At least twenty of the former were smashed to bits. I picked myself up in one piece, but slightly battered, and in fear and trembling sought Mr. Willoughby's office. I stammered, "I have done

an awful thing; I have just fallen from the steps in the stacks and smashed a whole tray of Predynastic pots." His face softened in a kindly smile and he put his hand on my shoulder: "The only important thing is: Did you hurt yourself?"

But if you tried to get a key to a case, he was likely to be tough. It took a savage siege of months by Dixon, Tozzer, and myself to reduce Mr. Willoughby to a state of subjection in which he handed me a key to the outside door of the Museum.

Mr. Willoughby seemed austere and at times unapproachable, but he had a quiet sense of humor. His implacable moods alternated with a gentle and sympathetic treatment, if he approved of you.

He was always very deaf, but I could never sneak by his office door without being heard when he wanted me for some tiresome job. Dr. Sylvanus Morley once brought a scientific visitor into Mr. Willoughby's office. Mr. Willoughby, as usual on such occasions, got out his table audition box and hooked it up to his ears. The visitor bellowed so loud that the window-panes rattled. As he left, Mr. Willoughby turned to Morley, cocked his thumb toward the retreating guest, and yelled, "He thinks I'm deaf."

Life with Willoughby in the Peabody Museum was somewhat like "Life with Father." It was never dull. After he retired Mr. Willoughby took an office in the basement under his former director's room. Here he worked on his book about New England archaeology, made his beautiful drawings, and received visitors with invariable charm and sympathy. His irascible fits vanished with his tenure of office.

Willoughby was a fascinating and mercurial man, a thorough artist, a marvellous technologist, and an astounding erudite ethnographer. He never spared himself in devotion to his duty, which he conceived to be that of building up the collections of the Peabody into the finest, cleanest, and most orderly anthropological study collections in the country.*

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* *Note.* For details on Mr. Willoughby's early life, I am indebted to Mr. Charles K. Bolton, of Shirley, Mass. Miss Constance Ashenden, Assistant Librarian of the Peabody Museum, has compiled Mr. Willoughby's Bibliography.

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FACTS AND COMMENTS

THE JERSEY COUNTY, ILLINOIS, BLUFF FOCUS

This group is characterized by low, domed shaped mounds located on the higher ridges and bluffs, and by village sites located on the second terraces in the bottoms adjacent to all weather springs and the larger creeks.

The outline submitted is based upon mound excavations and surface work in the village sites done on vacations and week-ends over a period of eleven years. No village site excavations have been made because they are all located in fields that are in crops during the time of year that excavation is possible. Thirty-four mounds have been opened and the thirty-fifth is about one-half completed at this time. Fourteen elevations that proved not to be burial mounds have been worked. It is of interest to note that none of these contained any limestone slabs or unworked mussel shells, while all mounds containing burials did contain these two items.

The mounds are of the accumulative type and the burials are not placed in any definite relation to each other or to the cardinal points of the compass. They are composed of the loess from the ridges and show no lenz formation.

The mounds range from 35 to 90 feet in length and the width is, as a rule, somewhat less than half of the length. The height of those excavated has varried from 2 to 11 feet and they have contained from 3 to 143 burials. With few exceptions, the long axes of the mounds are in the same general direction as the ridges and bluffs upon which they are located.

The work reported was all done in the west central portion of Jersey County, Illinois. All of the village site work and 721 of the burials are from one square mile of territory three miles north of the northern boundary of Pere Marquette State Park; twelve of the burials are from two mounds seven miles north of the park and 119 are from five mounds immediately north of the park.

An outline of the first four years' work in this group has already[1] appeared and by comparing the two, it can be seen that considerably more data have accumulated in the additional seven years.

ALLOCATION OF CULTURE TRAITS AS ARRANGED BY W. C. McKERN

Woodland

1. Flexed burials
2. Cremations
3. Secondary burials
4. Red ochre with burials
5. Burial in low domed mounds (Western)
6. Mound location characteristically on higher crests (Western)
7. Fire pits or burned areas in mounds (Western)
8. Pottery: grit tempered, cord imprinted, conoidal based
9. *Anculosa* beads (Western)
10. Spud, or handled celt; bit showing use (Western)
11. Pottery elbow pipes
12. Plumb bob
13. Animal teeth beads
14. Cut and perforated animal mandible
15. Unmodified antler flaking tools

Middle Mississippi

1. Extended burials
2. Marginella beads
3. Olivella beads
4. Disc-shaped shell beads
5. Cylindrical shell beads
6. Disc-shaped shell pendant
7. Polished, mussel valve pendant
8. Mussell shell spoon
9. Mussel shell hoe
10. Split bone awl
11. Discoidals
12. Celt
13. Chipped stone spade
14. Sheet copper plaque
15. Shell tempered, round based pot
16. Chipped stone chisel

Unclassified

1. Handled pipes
2. Hammer stones
3. Compound burials
4. Limestone slabs associated with burials
5. *Compeloma Integrum* bead
6. Bird claws
7. Flint pick
8. Stone tube

[1] American Antiquity, Vol. 1, No. 1.

TRAITS OF THE JERSEY COUNTY, ILLINOIS, BLUFF FOCUS

I. BURIAL TYPES—Based on 852 burials

A. Positions
1. Flexed.....715.....83.9%
2. Extended..... 43..... 5.0%
3. Secondary ..... 7..... .8%
4. Indeterminate..... 87.....10.2%

B. Uncremated—771 burials—90.5%
1. Positions
   a. Flexed—654
   b. Extended—40
   c. Secondary—6
   d. Indeterminate—71
2. Arrangement
   a. 582 individual burials
   b. 50 compound burials of 2 individuals
   c. 8 compound burials of 3 individuals
   d. 1 compound burial of 4 individuals
   e. 1 compound burial of 5 individuals
   f. 1 compound burial of 6 individuals
   g. 1 compound burial of 8 individuals
   h. 1 compound burial of 9 individuals
   i. 1 compound burial of 11 individuals
   j. 1 compound burial of 16 individuals
   k. 6 secondary burials
3. Seventy-eight of the uncremated burials were associated with stones
   a. Covered by stones—53 burials
      1. Pile of limestone slabs—5 adults and 9 infants
      2. Layer of limestone slabs—10 adults and 3 infants
      3. Layer of flint rocks—1 infant
      4. Layer or pile of limestone slabs under which nothing was found—9 (complete disintegration)
      5. Layer of flint rocks under which nothing was found—1 (complete disintegration)
      6. Single limestone slab—3 adults and 7 infants
      7. Two limestone slabs—3 infants and 1 child
      8. Four layers of limestone slabs—1 child
   b. Stones around or near a burial—22
      1. Partial vault of perpendicular slabs—3 children
      2. Limestone slabs inclined or flat partially around a burial—8 adults, 1 infant and 1 child
      3. Semicircular wall of flint rocks around a burial—1 infant
      4. Single limestone slab inclined at a 45° angle at the head and feet—1 adult
      5. Single limestone slab near a burial—7 adults
   c. Stones under a burial—3
      1. Two adults—each disposed upon a layer of limestone slabs
      2. Five small limestone slabs under the pelvis of Burial No. 27—Mound 190

C. Cremated in the flesh—81 burials—9.5%
1. Positions
   a. Flexed—61
   b. Extended—3
   c. Secondary—1
   d. Indeterminate—16
2. Individual cremations
   a. Three flexed adults
3. Mass cremations
   a. Ten flexed individuals—Mound 14
   b. Nine flexed and one extended individuals—Mound 7
   c. Two flexed, two extended and at least eight in which the position was not determined—Mound 38
   d. Twelve flexed individuals—Mound 10, Feature 2
   e. At least eight individuals, all disturbed—Mound 69
   f. A compound burial of three flexed individuals under two layers of limestone slabs—Mound 50
   g. Seven flexed individuals—Mound 201
   h. One secondary burial and a minimum of fifteen flexed individuals—Mound 200

II. SHELL BEADS

A. *Anculosa* shells
1. Necklaces
   a. Nine instances in which the beads have been found definitely around the neck
2. Hair ornaments (?)
   a. Fifty-three instances in which the beads were associated with the skull
3. Other locations
   a. One instance in which the beads were found under the pelvis of a child
   b. One instance in which the beads were found around the pelvis of an adult
   c. One instance in which the beads were scattered the full length of a child
   d. One instance in which six beads were on the chest of an adult
   e. One instance in which the beads were beyond the skull and around the trunk of an adult male
   f. Three instances in which the beads were scattered around the trunk—1 adult and 2 children
   g. One instance in which the beads extended from the shoulders to the hips of an adult suggesting a robe
   h. One instance in which the beads were under the bones of a secondary burial
   i. Two instances in which the beads were under the shoulders and back

B. Other types of beads
1. Necklaces
   a. Four instances of small disc beads
   b. Four instances of a single cylindrical bead
   c. One instance of seven cylindrical shell beads
2. Hair ornaments (?)
   a. Eight instances of Marginella beads associated with the skull
   b. One instance of small Olivella beads at the side of the skull
3. Ear ornaments (?)
   a. Single shell disc bead at each side of skull of Burial No. 73—Mound 69
4. Other locations
   a. Four small disc beads under the larger end of a split bone awl
   b. One *Anculosa* and four small cylindrical beads in mass cremation—Mound 69
   c. Fifteen *Marginella* beads at center of left humerus, Burial No. 48—Mound 69
5. *Compeloma Integrum* shell beads
   a. One in mass cremation—Mound 10, Feature 2
   b. One in Mound 26—not associated with a burial
   c. Two with Burial No. 30—Mound 50
   d. One in Mound 201—not associated with a burial but found with two mussel shell spoons
   e. One on left chest of Burial No. 54—Mound 190

III. BONE AWLS

A. Polished split bone awls—hair ornaments (?)
1. Twelve instances in which the awls have been associated with the skull
2. One instance in which the awl was under the right scapula, Burial No. 3—Mound 191

B. Utility awls:
1. Two in front of chest of Burial No. 1—Mound 12
2. Two at right elbow of Burial No. 73—Mound 69
3. Two in left hand of Burial No. 121—Mound 201

IV. HANDLED PIPES

A. Found in our excavations
1. Broken handled pipe, at the angle of right shoulder and neck of Burial No. 25—Mound 1
2. Human effigy handled pipe, four inches beyond skull of Burial No. 22—Mound 14
3. Small handled pipe, on back of left wrist of Burial No. 2—Mound 25
4. Small handled pipe, under cervical spine of Burial No. 21—Mound 17
5. Plain handled pipe, in the hollow of the right elbow of Burial No. 45—Mound 17
6. Plain, badly weathered, handled pipe, in the hollow of the right elbow of Burial No. 39—Mound 190
7. Plain, badly weathered, handled pipe, at the crest of the left ilium of Burial No. 8—Mound 191

B. Found by others
1. A large handled pipe (Cat. No. J49) from Mound 53, in contact with the left side of the skull of a flexed adult male

2. Bird-effigy handled pipe and a plain handled pipe plowed out simultaneously with the skull of a very old individual, found six miles above Grafton, Illinois
3. Small, plain handled pipe, from near Grafton, Illinois
4. Small, grit tempered, handled pottery pipe, from a mound two and one-half miles above Grafton, Illinois (Foersterling Collection)
5. Plain handled pipe, from a mound eight miles above Grafton, Illinois (Foersterling Collection)
6. Plain handled pipe, a surface find a Calhoun County. Found six miles above the mouth of the Illinois River
7. Small plain handled pipe, a surface find at the base of Mound 46, Cahokia Group, Madison County, Illinois
8. Two unfinished handled pipes, part of a cache of four unfinished pipes from a refuse pit, St. Clair County, Illinois (Herrington Collection)
9. Plain handled pipe, badly weathered, a surface find in Jefferson County, Missouri, near the Mississippi River

V. OTHER TYPES OF PIPES

A. Found in our excavations
1. Elbow grit tempered pottery pipe, mass cremation—Mound 69
2. Elbow (with short projection in front) grit tempered pottery pipe, at elbows and knees of Burial No. 5—Mound 47
3. Pipe similar to No. 2 (above), broken, disturbed area—Mound 14

B. Found by others
1. Elbow (with two knob-like projections at angle) shell tempered pottery pipe, found at Grafton Powder Works
2. Keel-shaped animal head effigy limestone pipe, from surface of same mound as B 2 under Handled Pipes

VI. HAMMERSTONES AND DISCOIDALS

A. Hammerstones
1. A pair at the edge of mass cremation—Mound 7
2. A pair above individual cremation—Mound 14
3. A pair in Mound 26—not associated with a burial
4. One in Mound 55—not associated with a burial
5. One in Mound 190—not associated with a burial

B. Discoidals
1. A pair above the edge of mass cremation—Mound 38
2. Three small, rough discoidals, under a limestone slab—Mound 14
3. Small limestone discoidal, at heel of Burial No. 46—Mound 68 (child)
4. Small limestone discoidal, under left knee of Burial No. 35—Mound 69 (child)
5. Small limestone discoidal, at left hip of Burial No. 12—Mound 52 (child)
6. Small limestone discoidal, at right elbow of Burial No. 44—Mound 50 (child)
7. Small limestone discoidal, from the sod of Mound 50—not associated with a burial
8. Small limestone discoidal, between pelves of the individuals of compound Burial Nos. 13 and 14—Mound 201
9. Small diorite discoidal, at pelvis of Burial No. 53—Mound 190 (child)
10. Small diorite discoidal, Mound 190—not associated with a burial
11. Three small discoidals in a group, Mound 190—not associated with a burial

VII. MUSSEL SHELL SPOONS

A. Shells ground thin and sharp edges rounded
1. Seven instances of a single spoon with a burial
2. One instance of two spoons with a burial
3. One fragmentary spoon in mass cremation—Mound 10, Feature 2
4. One spoon in Mound 69—not associated with a burial
5. One spoon in Mound 50—not associated with a burial
6. One spoon in pot No. 1—Mound 47
7. Two spoons in one of the two pots with Burial No. 93—Mound 69
8. One spoon in pot with Burial No. 16—Mound 50
9. Two spoons found together with a *Conpeloma Integrum* shell bead—not associated with a burial—Mound 201
10. One spoon in Mound 190—not associated with a burial

VIII. PLUMB BOBS

A. Associated with a burial
   1. Double-grooved hematite plumb bob, at the right elbow of Burial No. 3—Mound 47
B. Not associated with burials
   1. One unfinished granite plumb bob, from the surface—Mound 1
   2. Two finished limestone plumb bobs, from the surface—Mound 1
   3. One grooved and one unfinished hematite plumb bob, from a disturbed area—Mound 1
   4. One grooved magnetite plumb bob from a disturbed area—Mound 47

IX. POTTERY—Grit tempered unless otherwise specified

A. Associated with burials
   1. A pot at each side of the head of Burial No. 93—Mound 69
   2. A pot at the right knee of Burial No. 2—Mound 50 (not restorable)
   3. A pot between the skulls of compound Burial Nos. 5 and 6—Mound 50
   4. A pot at the left shoulder of Burial No. 16—Mound 50
   5. A pot at the right elbow of Burial No. 33—Mound 50
B. Not associated with burials
   1. Nine broken, restorable pots from Mounds 1, 17, 24, 47, 50, 69 and 190 and Village Site No. 19
   2. One broken restorable shell tempered pot from Mound 55
   3. Four decorated sherds from a single vessel—Mound 22
   4. Several sherds with small animal head on a rim sherd—Mound 50
   5. Occasional sherd (mostly cord imprinted) from Mounds 14, 18, 29, 32, 38, 50, 52, 68, 69, 190, 192 and 201

X. RED OCHER

A. Associated with burials
   1. Ball, somewhat larger than a walnut, at right costal margin of Burial No. 7—Mound 22
   2. Irregular oval piece (2¼ inches long, with one side rubbed flat), under trunk of Burial No. 23—Mound 24
   3. Small irregular piece, at right elbow of Burial No. 3—Mound 47

XI. GRANITE CELTS

A. Associated with a burial
   1. Small granite celt (3¼ inches long), at right elbow of Burial No. 3—Mound 47
B. Not associated with a burial
   1. Numerous celts of this type have been picked up on the village sites

XII. SPUDS

A. Associated with a burial
   1. Diorite spud 8¼ inches long over right ilium of Burial No. 13—Mound 190. Bit shows definite use
B. Not associated with a burial and found by others
   1. Diorite spud, 11¼ inches long, surface find, northwest Jersey County. Bit shows no definite use
   2. Diorite spud, 9 in. long, surface find, northwest Jersey County. Bit may show a trace of use

XIII. UNWORKED MUSSEL SHELL AND SMALL FRAGMENTS OF LIMESTONE

A. In all mounds containing burials, numerous unworked mussel shells and fragments of limestone were scattered throughout, but not associated with burials. These features did not occur in fourteen elevations excavated in which no burials were found.

XIV. OTHER ARTIFACTS—occurrences not sufficiently frequent to be classed as positive traits in a local culture complex.

A. Polished shell pendants
   1. One large mussel shell pendant, from a disturbed area—Mound 14
   2. One small mussel shell pendant, at back of neck of Burial No. 22—Mound 14
   3. One circular shell pendant, from the surface—Mound 1
   4. Fragment of conch shell base—Mound 190, not associated with a burial
B. Mussel shell hoes
   1. Two from Mound 50—not associated with burials
C. Teeth—Beads
   1. Broken beaver tooth, Burial No. 6—Mound 68

2. Drilled split bear canine—Mound 10, Feature 3
3. Small wolf or coyote tooth, Burial No. 1—Mound 54
4. Cut section of fox mandible, Burial No. 49—Mound 69

D. Antler
1. Unidentified rectangular antler object, at right elbow of Burial No. 73—Mound 69
2. An object (8 inches long) that appeared to be the handle of a flint pick, with Burial No. 3—Mound 16
3. Two instances of two antler flakers and one of three, with burials

E. Bone
1. A polished bone object (4¼ inches long), apparently made from an anterior vertical section of an animal leg bone—hair ornament (?)
2. Broken, polished bone, hair ornament (5½ inches long) two inches of shaft remaining, three and one-half inches carved to represent a bird's head, probably a kingfisher
3. Bird claws—small eagle or large horned owl
   a. Three at the skull of Burial No. 7—Mound 32
   b. One in the pelvis of Burial No. 1—Mound 47
4. *Os Penis* of Raccoon
   a. Two at left elbow of Burial No. 18—Mound 201

F. Artifacts made of flint
1. One deeply corner-notched arrowhead in disturbed area—Mound 1
2. One corner-notched arrowhead—Mound 38
3. One corner-notched knife, Burial No. 1—Mound 12
4. One expanding-stemmed arrowhead—Mound 26
5. Triangular knife, under which there were four bone needles, Burial No. 1—Mound 26
6. One straight-stemmed knife, at lower dorsal spine of Burial No. 26—Mound 24
7. One drill—Mound 10, Feature 3
8. Four chips and two antler flakers—Mound 10, Feature 3
9. One chip and two antler flakers—Mound 10, Feature 3
10. One small, side-notched, arrowhead—Mound 10, Feature 3
11. One chisel, three picks and one chip, Burial No. 24—Mound 68
12. Three chips, Burial No. 35—Mound 68
13. Pick of a curved flake of flint, Burial No. 3—Mound 16
14. One blackened, deeply corner-notched arrowhead, in base of cremation—Mound 8
15. One blackened pick in mass cremation—Mound 14
16. Small arrowhead imbedded in the twelfth dorsal vertebra of Burial No. 6—Mound 25
17. One-half of a spade (bit portion), in Mound 12—not associated with a burial
18. Grey oval knife, not associated with a burial—Mound 55
19. Polished, bit portion of a white chisel, not found with a burial—Mound 55
20. Broken white flint knife, surface of Mound 50
21. Thirteen small arrowheads, two unworked flint chips, one flint pick, two small unworked sandstone chips, three antler flakers and two *os penis* of the raccoon, at the left elbow of Burial No. 18—Mound 201
22. Three unworked chips, at back of left wrist of Burial No. 57—Mound 201
23. Two triangular knives, not associated with burials—Mound 190
24. One round base knife, not associated with a burial—Mound 190
25. Three side-notched arrowheads, not associated with burials—Mound 190
26. Two corner-notched arrowheads, not associated with burials—Mound 190

G. Copper
1. Sheet copper plaque approximately 5 inches square, just beyond and to the left of the skull of Burial No. 26—Mound 50

H. Grooved ax
1. Small, grooved, diorite ax, not associated with a burial—Mound 190

I. Stone tube
1. Incompletely drilled greenstone tube, Burial No. 4—Mound 190

J. Stone cists
1. Just beyond the head of Burial No. 6—Mound 38
2. One in Mound 10, designated as Feature 4

K. Fire pits
1. Mound 24—fire pit eighteen inches in diameter containing charcoal and masses of baked clay
2. Mound 29—area of fired clay 2 feet in diameter—no associations
3. Mound 68—large area of discolored soil containing only charcoal
4. Mound 68—several large limestone slabs on edge; there had been a fire which produced extensive discoloration all around and below the slabs

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A REENFORCED SALT-PAN SHERD FROM KENTUCKY

A unique technique of ceramic manufacture was practiced by the inhabitants of the Goheen site in Marshall County, Kentucky, ML 14. This unusual procedure was found in a salt-pan vessel from a midden pit, Feature 22. Apparently after the salt-pan vessel was made it was found that certain portions of the vessel walls did not come up to the thickness of the rest of the vessel. An additional coat of clay was added to the outside of the vessel, in the weak spots, thus reenforcing the vessel walls. The original exterior displayed textile impressions; the part that was reenforced was absolutely plain. It is the plain part that is important, for the potter who placed this secondary coat of clay on the exterior of the vessel was doing the archaeologist an unintentional favor—he was making a direct positive of the textile used to cover the mold from which the vessel was formed.

Photographs and drawings are used to show sherds, cross section of sherds, and weave of the textile used on the outside of the vessel. The textile was twined openwork made up of rather coarse cord which was made with a clockwise twist, using some coarse fiber. The cord measures one-eighth of an inch in diameter; the spacing of the horizontal elements is every half inch.

PASTE: Technique of manufacture was probably molded; tempering, ground shell; texture, medium; hardness, 2–3; paste, gray; color, lip blackened in places by fire clouds, interior buff, exterior, chocolate brown.

SURFACE FINISH: Interior, smoothed; exterior, textile impression over greater part of the body with smoothed areas where walls were reenforced.

FORM: Lip, generally rounded
Body, saucer shaped, no whole vessels found
Thickness, lip 16 mm., body 9.5 mm.

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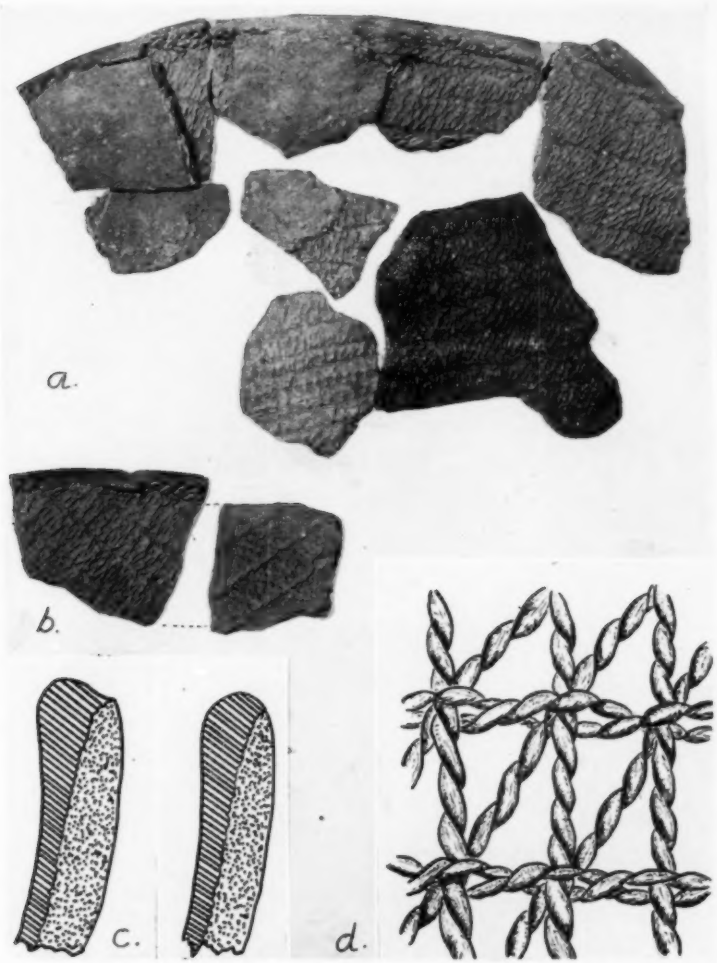

Goheen site, ML 14, Marshall County, Kentucky. Feature No. 22.

a, sherds of a salt pan from this feature showing reinforcing patch; *b*, negative and positive impression of textile revealed on left hand sherd, above; *c*, the stippled area on the cross sections shows the reinforcement; *d*, the impression revealed twined openwork.

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BOOK REVIEWS

Excavations in the Forestdale Valley, East Central Arizona. EMIL W. HAURY with an Appendix, The Skeletal Remains of the Bear Ruin, by NORMAN E. GABEL. (University of Arizona Bulletin, Vol. XI, No. 4, Social Science Bulletin No. 12, Tucson, Arizona, 1941, 147 pp., 12 plates, 44 figures.)

To the archaeologist, the organization of any report is important. If the reader is not familiar with the material, he wants to know just what was found, and under what conditions, without wading through pages of wordy text. If the report falls within his field he will use it as a tool for reference, in which case the organization is even more important, when he must constantly refer to the volume. Haury's present report follows in the footsteps of his earlier Mogollon reports and fulfills all the prerequisites as to availability of evidence, clarity of presentation, development of historical background, the environmental picture, and the interpretation of data.

Haury's problem is again that of the Mogollon. This time it is a marginal manifestation with which he is dealing. The Bear Ruin covers a short time span between 600 and 800 A.D. and has been assigned to a single phase (Gladwin's system), which has been named *Forestdale*.

This reviewer feels it worth while to reiterate a few of the points made by Haury which are pertinent to the Mogollon, Hohokam, and Anasazi. The marginal character of the Forestdale phase is its most important aspect, a point nicely developed by Haury. Not only are Anasazi and Mogollon elements of culture present in about equal strength, but there is the beginning of an amalgamation and specialization that resulted in a later localized development in the Forestdale region. That we have here the first impact of two cultures seems quite obvious. Among the houses, both Anasazi and Mogollon types are present in pure forms as well as hybrids that include such features as a side entrance *and* a ventilator in such a way that one of these traits was unnecessary. The pottery is both Mogollon and Anasazi. Two physical types have been isolated. The Mogollon has been held by some to be a marginal development of the Anasazi, but, if the Forestdale phase is already a differentiated manifestation resulting from a union of Mogollon and Anasazi traits at a time when the Anasazi were just beginning to establish cultural integrity, we must perforce view the Mogollon in the light of its original interpretation by Haury as a separate and earlier culture.

The Forestdale data not only give the Mogollon problem additional breadth but provide additional evidence as to the antiquity of the Hohokam. It has been felt by some that Basketmaker sherds intrusive in the Gila Butte phase at Snaketown did not necessarily mean that the Gila Butte phase was coeval with Basketmaker III. The lack of Gila Butte intrusives in Basketmaker III sites was cited as a basis for this assumption. The presence of Gila Butte sherds in the Forestdale phase in the seventh century (dated by tree-rings), plus Basketmaker III intrusives should abolish all doubts as to the antiquity of the Gila Butte phase. Before this time, the Anasazi were not making pottery and stratigraphic evidence in the Mogollon and Hohokam certainly indicates that these two cultures were the possessors of pottery making techniques at a time when the Anasazi were not.

The reviewer feels that Haury is in error, on pages 124–125, when he assigns more weight as an indicator of cultural affiliations to pottery than he does to house type. Unfortunately, the skeletal material that could be analyzed was meager but of the two defined types, both could be assigned to the Anasazi. In Figure 20, Haury shows a reconstruction of a house with a notched ladder at the end of an entrance passage. This reviewer has been informed by Earl Morris that this is a very late trait in the Anasazi.

Haury makes all of his points in his last section except possibly his intimation that the Mogollon can be derived from the San Pedro phase as defined by Sayles (1941). To quote (p. 130), "If one adds pottery, house building, earth burial, agriculture, and a few minor traits to the San Pedro Stage, the result is the beginning of the Mogollon Culture."

Pottery, house building and agriculture are important items. They have been among the chief diagnostic traits in differentiating the major Southwestern cultures. In this line the writer wishes that Haury had not omitted discussion of the origin of the pit house in the Southwest. He skirts the problem but that is all. It is obviously pertinent to Haury's reconstructions, at least as pertinent as the very generalized Cochise culture. There is no well defined house for the San Pedro phase. There is a well developed subterranean house with central supports in the Georgetown phase. The pit house in its earliest known forms is differentiated in the Mogollon, and in the Anasazi. Here we have a problem of immediate importance.

The abundant maps, charts and drawings tend to impress on the reader's mind the various points made by Haury. For those interested in Southwestern archaeology or in culture contacts, *Excavations in the Forestdale Valley* is a decided contribution.

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Indians of South America. PAUL RADIN. (The American Museum of Natural History, Science Series, Vol. 3. Doubleday, Doran and Co., New York, xvii, 324 pp., 1942, $4.00.)

In one treatise Mr. Radin presents a broad survey of the Indian cultures of South America. As such, the volume is unique and valuable, even considering the fact that the author states that it is intended as a "general, nontechnical survey." Obviously, the numerous and culturally varied tribes of the continent cannot be covered with any completeness, and so certain tribes are selected as representative. Thus he takes up in some detail the Arawaks of the West Indies and of the Guianas; the Barama River Caribs; the Tupinamba; miscellaneous tribes in the mixed up Amazonian basin; the Ge, of East Brazil; the Mataco and Lenguas of the Chaco; the Abipones of the plains; the Ona and Yaghan of the far south; such "fringe" tribes as the Chane, Chiriguano, Jivaro and Araucanians; and finally the Quechua, Aymara, and Chibcha of the Andes. Likewise, the author does not attempt to give a complete or rounded picture of any one tribe, but rather stresses special aspects of each. Blowguns and dugouts come under Arawak; medicine men and the mysterious *kanaima* under Carib; cannibalism for the Tupinamba; dual organization for the Ge; political structure for the Quechua; and the like. This is obviously a sensible approach in a broad survey of this kind. No claim is made for originality of materials, and the book is composed largely of summaries from a few standard sources, plus extensive direct quotations—actually one-third of the book—some judiciously chosen and others that might have been better selected.

Mr. Radin has a profound and intimate knowledge of the ethnology of Mexico and North America. Consequently, as he surveys the southern continent, particularly the vast Amazon, he is impressed by the number of familiar features and feels called upon to explain all. First, the Island Arawak receive culture influence from Mexico via the Gulf states which they transfer to South America at a late date. Leaving this concept to one side for the moment, we next learn that a previous migration or spread of cultural influence must have swept from Mexico to Florida through the Antilles and down to South America in order to bring "maize and the custom of torturing and then dining upon their

war captives" to the Tupi-Guarani. Mr. Radin insists that he does not suggest that the Tupi-Guarani were invaders from outside South America, rather that they once lived at the mouth of the Amazon in a position to receive such influences from the pre-Arawak transferers. It seems strange to the reviewer that these mysterious culture bearers traveling through the West Indies about 1200 A.D. left no remains which archaeologists have yet discovered. The theme of the Arawak and their predecessors receives undue emphasis in the first chapters of this volume. In a book of this kind the author has not been able to present the evidence for any reasonable discussion. How, for example, does he explain Nordenskiold's work in Mojos where a complex archaeological culture, presumably Arawak, is apparently contemporaneous if not older than Classic Tiahuanaco?

Mr. Radin's insistence on maize as a symbol of agriculture seems unfortunate. He speaks of the non-agricultural Carib, because they lacked maize. Again we read (p. 68) "The cultivation of cassava is after all only in a secondary sense to be regarded as an indication of a full-fledged agriculture, and the same holds true for tobacco." For the Amazon proper where manioc makes life possible and corn is at best a secondary crop this is an astounding statement. The argument has been clearly presented before in Robert H. Lowie's article on "American Culture History" (*American Anthropologist*, Vol. 42, no. 3, pp. 409–428, 1940).

One would like a better evaluation of the role of the Indian in contemporary South America; a more profound consideration of the Andean civilizations in relation to the rest of the continent; more chapters like that on the Aymara based on the Bandelier manuscript. In total consideration, however, we must again stress that this is a valuable, interesting, and readable contribution.

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Estudio de Hombre. Spanish translation of "Study of Man" by Ralph Linton. DANIEL F. RUBÍN DE LA BORBOLLA. (Fondo de Cultura Economica, Mexico, 1942.)

There is little need here of repeating or of recording the unanimous praise with which Linton's *Study of Man* was greeted in 1936. It is a satisfaction to anthropologists to know that this is one of the first books in our subject which has been selected by the Fondo de Cultura Economica for translation and publication. All will agree that this choice was a worthy one. The edition is called an "Edicion Revisada" and consists of a very few changes by the author from the English edition. The excellent translation is by Professor de la Borbolla, of the Instituto de Anthropología e Historia.

It may be of interest to describe the Fondo de Cultura Economica. Dr. Hanke of the Hispanic Foundation of the Library of Congress has kindly furnished me with the following information. The Fondo was organized some three or four years ago by a group of professors at the University of Mexico and the director of the Bank of Mexico, Eduardo Villaseñor. Professor Daniel Cosio Villegas is the director and has been the guiding financial and academic spirit. The Fondo is perhaps the closest approximation in Latin America to one of our University Presses in that its standards are strictly academic and in some cases important works have been published at a loss in order to get them before the public. In general they have been most interested in publishing original works in the field of the social sciences, with emphasis upon economics and history.

One of the significant activities of the Fondo is the translation of fundamental works which have previously appeared in other languages and works from French, German, Dutch, and English sources have been published. There is good reason to believe that many of these books are having an influence in fixing economic, historical, and

anthropological terminology in the Spanish language. Dr. Benedict's book, "Race, Science and Politics," and a collection of papers mainly on John L. Stephens, entitled, "Los Mayas Antiguos," are also publications of the Fondo and it is to be hoped that others may soon join this goodly company.

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Newport Tower. Philip Ainsworth Means. (xxi, 334 pp., 141 figs. New York: Henry Holt and Co., 1942. $5.00.)

In June 1677 Governor Benedict Arnold of Rhode Island referred, in his will, to "my stone-built wind-miln." Beginning at this time, if not before, the two main theories concerning the origin and use of the structure developed. (1) The structure is the remains of a wind mill built by Benedict Arnold to replace a mill which had been destroyed in 1675 by a gale of wind. (2) The structure is all that remains of a church which was built by Norse immigrants to the island of Aquidneck. Through the years the popularity of these two theories waxed and waned as a multitude of arguments pro and con were offered, both logical and illogical, either in prose or poetry.

Philip Means became interested in the structure and set out to delve into its history. The result is *Newport Tower*, in which the theories are stated and examined with an impressive thoroughness. A book such as this cannot be passed over lightly. The delightful humor of the author and his easily readable prose does by no means detract from the value of the book to historians and archaeologists. If the Norse came to Rhode Island, or New England for that matter, during the 11th century, to remain there for several hundred years, they should have had some influence upon the aborigines of the region. It is thus conceivable that the Indians who have always been thought to be purely American were, in reality, sullied by contact with Europeans during a period preceding the eastward expansion of the Iroquois. Such a possibility will stick (or should have stuck long before now) in the craw of any eastern archaeologist.

Following an introduction by Stefánsson, Means, in Part I of the book, introduces the subject by describing the background of the study. He also supplies a meticulous description of the Tower. In Part II, "The History of the Two Rival Theories," the author really gets down to work. In a series of chapters, the basic facts and the general background for the support of the two theories concerning the origin of the tower are treated in great detail. The history of each theory is fully documented by a host of references and quotations. The growth of the theories is amply shown and one discovers how the contemporary conceptions have developed.

Space does not permit an analysis of the various arguments but there are a few points which may be mentioned. The belief that Arnold built the tower is founded upon several supposed facts and a number of speculations. One point is that in building the tower he copied the wind mill at Chesterton, England. Means's proof that this is false is based on the practical certainty that Arnold never saw the English structure and thus could not have copied it.

The rest of the discussion of the Arnold theory is based upon subjective opinion. As far as the logic of this particular part of the argument is concerned one author's opinion is as good as another's. A considerable degree of plausibility is added to the argument against the Arnold theory by the suggestion that the tower was built long before Arnold's time and that he simply improvised a mill on top of the tower. This theory of Means's is ingenious but it is not convincing. The idea that the tower is the remains of a medieval type of building is only hypothetical and no conclusions regarding the date

of its construction can be drawn. While the whole argument put forward by Means appears, at first, to completely demolish the Arnold theory, actually the data is incomplete and a restated version of the theory is still tenable. Means recognizes this when he begrudingly admits that there is a 10% possibility that it may yet be proved that Arnold built the tower.

Following a cogent discussion of the Norse theory, there is a fascinating discussion of the history of buildings which are similar or analogous to the Newport tower. European, French Canadian and American colonial windmills are discussed and illustrated. Furthermore Means turns to a discussion of the architecture of round churches in Europe. This discussion, which he calls the prototypical argument, takes a form which is common in archaeology, as well as in other disciplines, but it has led many an argument to its doom. In general, the concept is that every somewhat arbitrarily defined unit in a culture, whether it be an arrow point, a pot, a building, or a style in art, has originated from some previous form. Means dislikes, practically to the point of refusal, to admit that the Newport tower could have been built by some colonial architect who was capable of a little independent thinking.

The prototypical argument shows how the medieval round churches in Europe were adaptations of the architecture of the Church of the Holy Sepulchre in Jerusalem. It also shows the modifications in the style and construction which were introduced into Europe, particularly the north. Comparisons between some of these churches and the Newport tower show a similarity between corresponding elements such as the central tower, the pillars and arches, possibly the windows, and with some question in this reviewer's mind, the location of the fireplace. Such a comparison leading to the eventual conclusion that probably the tower is the ruin of a medieval church, possibly of Norse origin, may be satisfactory in some ways. It must be noted however that a meticulous examination of the evidence brings to light certain questions regarding method and varicus lacunae in the foundations of the argument which require further elucidation.

It is obvious that Means's argument is more than just an intellectual exercise. There are a number of significant points in the comparison between the Old and New World buildings which are well taken, and it is possible to accept, with qualifications, the general hypothesis as a statement worthy of future investigation. During the course of producing this hypothesis, Means has mixed speculations with facts. This, without any question, adds to the general interest of the text and enhances the story, but it does provide traps which will ensnare the unwary. Unless the section is read with care, the reader will find himself being convinced of the validity of Means's theory more by the power of the rhetoric than by the arrangement of the actual facts in the case. Means's skill in writing is well exemplified here, he does not actually overstate the case but the various amusing and intriguing embellishments of the argument do, in places, puzzle those who are searching for definitive data.

In view of the amount of space given to the Norse and Arnold theories it may be suggested that more attention could have been given to a discussion of other possible sources. Recognizing that the tower includes a number of features which are reminiscent of Medieval architecture does not actually prove that the tower was built at this period. The tower is not a copy of any known building, and so the tie between Newport and Europe is not direct but exists only as a diffusion of a group of architectural concepts. It is possible that the tower may represent the ideas of one architect, or it may be a collection of the memories of a number of people who, when they were attacked by an urge to build a building, found themselves assembled on Aquidneck. This could have happened at any time after 1492 as well as before. The use of medieval ideas may also be the result of necessary improvisation accomplished by a group of mariners, unversed in ar-

chitecture but steeped in the memories of home, who decided to build this enigmatical tower. Admittedly, these ideas may be far-fetched but when properly and completely stated they loom large as qualifications to the hypothesis that the tower is a Norse building erected between the 12th and 14th centuries.

There is one additional point which should be mentioned. Throughout the long history of the controversy concerning the Norse in America one major problem has been repeatedly discussed. Where were Markland, Vinland, and the other places mentioned in the sagas? As far as I know, there has not been a single answer which has been at all satisfactory. Means avoids this controversial point on the grounds that if he proves the Norse built the tower it goes without saying that they lived on Aquidneck. This is permissible but unfortunate, perhaps through no fault of the author himself. In developing an hypothesis he has not yet proved that the Norse built the tower. Thus the field is still wide open and if former developments in the literature are any indication of what will happen in the future, those interested in the problem may be sure that they will have to wade through many horrible articles, written by enthusiasts and uncritical dabblers in history, which warp and twist the cryptic descriptions in the sagas into 12th century accounts of Newport.

These and other criticisms which will be leveled at the book by less sympathetic reviewers do by no means detract from its value. Anyone who has attempted to delve into the problem of the Norse in America knows the nauseous character of that literature. With the exception of a few really good discussions, the Norse have been the butt of the most illogical arguments that man can devise. Furthermore, these intrepid seamen and colonizers have fired the warped imaginations of the strangest collection of the most untutored, uncritical and wildly speculative romanticists, to say nothing of the shameless liars. It is small wonder that one takes up such a book as *Newport Tower* in fear and trembling. It is a huge relief to find one's trepidation completely unjustified.

The author has approached the subject cautiously and with due realization of the consequences of his work. Even though he scarcely disguises his personal hope that the Norse did build a church on Aquidneck he does not, in the end, lose sight of the fact that the data are not yet conclusive. His theory is offered as his own interpretation of the data and he is at complete liberty to do this, in fact one is inclined to favor his hope, even though it is not possible to reach as definite an opinion. There are faults in the book, many of which are recognized by the author, others are not serious. Aside from these we find a most excellent presentation of an extremely interesting and plausible hypothesis. It is to be hoped that this will set the standard of reasonable discussion in a previously unsavory literature and that from now on we will be able to read logical and interesting discussions of a fascinating and historically important problem. This is the sanest book about the Norse in America that I have ever read.

FREDERICK JOHNSON
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Prologue to New England. HENRY F. HOWE. (xi, 324 pp., illustrated with maps, bibliography, index, $3.00, Farrar & Rinehart, N. Y., 1943.)

The opening is a threat to blast Plymouth Rock from its historic foundations, notwithstanding the author's own forbears, and show that forty odd voyagers of record had come before those Pilgrims. His ferocity is belied, however, by his smiling face on the dust cover. It is as quickly toned to mild complaint that the public does not read more history and therefore know already what he is about to tell. If general readers only will honor Dr. Howe's book as—he is quite right—they have not the work of his predecessors

in the field of New England's earliest history, they will be pleasantly engrossed hours on end and specially rewarded for their effort. This is an exceptional book. Though written by a self-styled amateur, it is presented with verve that alleged professionals might emulate. Dr. Howe has worked in the mines of documentary and circumstantial evidence enthusiastically and brought out to his narrative a great amount of his own interest. He has skilfully correlated old maps and charts with his own detailed knowledge of the coast. It is a pity this early cartography could not be more clearly reproduced. But it is a feature of the book and if the reader gives the illustrations close examination, resorting to a magnifying glass where necessary, he will profit.

If the general public only will read, it will learn of John Cabot, Italian, who sailed for England after Columbus' discovery for Spain; of Cabot's son, Sebastian, who skirted this shore from Nova Scotia to Hatteras and did not tell perhaps all that he saw. It will learn of the brothers Cortereal, Portuguese, who disappeared from recorded history somewhere off Newfoundland but one of whom may have left that mysterious inscription cut in rock near Dighton at the head of Narragansett Bay. It will read especially of Verrazano, Italian, who sailed for France along the seaboard all the way from the Carolinas to Maine and who passed two weeks among the Algonkians of Narragansett not fifty miles from Plymouth on Massachusetts Bay. Taking licence with historical supposition, for no record of course exists, Dr. Howe will amuse and—it is to be hoped—stir his general reader with his thought that a grandfather of the Pilgrim's friend, the sachem Massasoit, may have sat in one of those twenty or more dugout canoes which clustered about Verrazano's ship that brooding day in 1524.

Far more valuable to the general reader, however, are the author's two conclusions from his careful study of the record which Verrazano did make. For one, Verrazano did nothing which could prejudice the natives against white men. This was a remarkable feat indeed when compared with Spanish actions to the southward or even with subsequent behavior in this vicinity by the Pilgrims on Cape Cod and at Plymouth. For the other, Verrazano found no treasure in New England such as the Spaniards had taken from Aztec temples and he in turn had seized from them. If the general reader would understand the peculiarities of the relationships among Frenchmen, English, and Indians on this continent from that time until this, he should give much thought to these two conclusions.

The Spanish Court was fully aware that Verrazano had stolen their treasure. And they knew that French fishermen were competing with Spanish off the northern shores of this great unknown land. The connection between these material interests and control of the land itself must have been as apparent as it was intimate. In any case, within the year after Verrazano had returned to France, Estevan Gomez was off Newfoundland and coasting down around Cape Cod perhaps into Narragansett Bay before he veered southward to Cuba. Unlike Verrazano, Gomez seems to have kidnapped Indians. Regardless of that, the struggle was on between Spain and France for supremacy in North America. There followed for France the expeditions of Cartier into the St. Lawrence far to the north, the visit of Allefonsce to Massachusetts, attempts by the Huguenots to settle in Florida and in Brazil, and the voyage from Florida to Newfoundland which the French cosmographer Thevet described as if he had made it, though he himself may not. And for Spain, De Soto, then Maldonado in search of De Soto, and Menendez extended both knowledge of the continent and ambition to have it exclusively.

Meanwhile Portuguese, but more often Englishmen, of whom Sir John Hawkins is the most famous, played in and out of the scene, despoiling Frenchmen and Spaniards there in the south, rivalling them here to the north, always complicating the plot and above all hindering the firm establishment of either in that great middle region where Virginia and New England a century later were to emerge.

Most intriguing of all these early English figures, though it cannot be said that he obstructed Spaniards in any enterprise except his capture, is David Ingram, a common sailor who escaped the disaster which overtook Hawkins near Vera Cruz. Ingram walked, actually walked across the continent to the Atlantic Coast and reached the neighborhood of St. John in New Brunswick of today before he was picked up by a friendly French trader. So much of his story is accepted. The rest of it—well, no. Fourteen years after the event he said many things, before witnesses indeed, but far beyond the credible. His two companions on the journey did not talk, if they could. Though recognizing here an argument for education, I have room for no more than exclaiming what a field day that would have been for my friends among the anthropologists and archaeologists. They would have learned about Indians with Ingram as they never can from shell heaps and fish weirs, that is if they had survived the jaunt with Ingram. Further speculation, however fascinating, is idle with regard to what would have happened on this continent prior to 1600 if scientific observation had accompanied exploration and had governed the consequent efforts of statesmen to adjust red men and white in each other's ways of living and thinking.

After a quick view of those reconnoiterers in the last quarter of the sixteenth century, like Raleigh and Gilbert who saw what they might do with colonies but could not for one reason or another make the beginning which would endure, Dr. Howe enters upon the major part of his book with the actual forerunners of the Pilgrims. They were the merchant adventurers, explorers, traders, fishermen, kidnappers, and downright buccaneers who opened the seaways, mapped the coasts, searched out the harbors, and examined the landing places of New England long before the Pilgrims arrived. He has prefaced these chapters with a calendar of the voyages which dispels any notion that they were sporadic and haphazard. You may still wonder why no permanent foothold was gained until the Pilgrims came. To this query the author has answers that are quite persuasive but do not explain all that there is in the mystery of cause and effect.

For one example, Gosnold who gave Cape Cod its name attempted a colony on Cuttyhunk near Martha's Vineyard and the Narrangansett country of Verrazano. Gosnold used the Italian's report on the region, but not his policy toward the natives. Dr. Howe supports his point that there was here no real purpose to colonize by stressing the facts that in the first place these Englishmen were merely trespassing upon Raleigh's preserves, and evidently knew it, and in the second place were far more interested in their cargo of sassafras for the English drug market and the furs which they were obtaining from the Indians. In the course of events came the usual thievishness on both sides. It is hardly fair for us to assume—as Dr. Howe certainly does not—that Indians were so different from other human beings that they did not know theft, and practice it, before white men reached these shores. But the Englishmen stole a canoe, far more valuable to the Indians than the shield which one of them tried to get away with, only to be publicly humiliated by the white men. The shield had to be returned to its owner. The canoe went to England. Under such circumstances there was bound sooner or later to be a fight and withdrawal by the English marauders just as soon as they were outnumbered; withdrawal by all of them including, naturally, those who might have thought for a while of staying on and establishing a permanent trading post.

Even if they had remained, it would not have been a colony as we think of the Pilgrim settlement within the arm of Cape Cod. Gosnold's men were without women. Dr. Howe noted how concerned the Indians were for theirs as these strangers arrived. He might have speculated upon the historical possibilities had these Englishmen come to Narragansett in 1602 with their families as the Pilgrims were to do later into Massachusetts Bay. His thinking would have led him, I am sure, to give more consideration in

this book to those social forces in England, both economic and religious, which were creating there such distress and uncertainty that men determined to leave with wife and child, risking all in the hope of something, however meager at the start, which would give promise of better living soon. In these discontents, perhaps more than we may think, were the dynamic forces that made the permanent settlements of both Virginia and New England.

By the same token the visit to the very site of Plymouth by Martin Pring in the following year of 1603, however important as reconnaissance, had no chance at all of becoming the first settlement on that historic spot. The stories of his youth who played the guitar to the delight of the Indians as they danced "twentie in a Ring" and his "two excellent Mastives, of whom the Indians were more afraid than of twentie of our men," were alluring no doubt as tales to tell the folks back home in Bristol; but they moved not a man of them, I venture, to think of betaking himself to permanent settlement there or anywhere else in New England. Seventeen years later Pilgrims broke the way under very different persuasions and with very different ends in view.

Frenchmen vied with English in these preliminary excursions to the new world. As Waymouth, turned northward by head winds and the shoals of Nantucket from Gosnold's country, was discovering Monhegan Island in 1605 and establishing a base for English fishermen and explorers off the "maine", Pont Gravé, De Monts, Poutrincourt, Champlain were probing the coast southward all the way from Port Royal on the Bay of Fundy to Plymouth Harbor and around Cape Cod into the waters where Gosnold had been. This expert reconnoitering, however, did not result in a New France where New England was to appear. Dr. Howe gives two particular reasons: Indian violence at Gloucester and at Chatham on the Cape, and the loss of the King's support for the colony at Port Royal. No doubt the attitude of the natives discouraged return another season for more of the same murderous resistance. But more likely, the immediately lucrative fur-trade in the St. Lawrence Valley to the north gave the direction to Champlain's efforts for the next thirty years. These laid the foundations of New France behind the coastal ranges far westward into the mid-continent. And again, it may be suggested that men without families are marauders rather than settlers. It is not that settlers are lacking in the thieving instinct. Theirs is different in manner and degree, not in its ethical structure. This would seem really a problem not of morals but of personal mobility.

The author's account of the English settlement at Sagadahoc in 1608 on the Kennebec renews the emphasis upon it as important in maintaining England's claim against French encroachment despite its failure to survive. From this he goes on to three portentous visits to these shores. Henry Hudson, Englishman sailing for the Dutch East India Company, not only gave the Indians of Maine further experience with the treachery and rapaciousness of white men but made the beginning in the Hudson Valley for the Dutch who would compete with his own countrymen later in southern New England. Samuel Argall not only came northward from Virginia for fish to save its starving population but obtained familiarity with the coast which he used later when he returned to destroy the French settlement at St. Sauveur on Mount Desert Island and entrenched England's if not Virginia's claim to the region. Edward Harlow, as Champlain before him, found the Indians on Cape Cod viciously opposed to being kidnapped, but he succeeded in taking back to England from Martha's Vineyard the Indian, Epenow, who was to give Sir Fernando Gorges a great deal of information about the coast of Massachusetts and, upon returning to his native land, to defend it so fiercely against his captors that they reported home: "there was a War broke out between the English and the Indians." From Epenow to Geronimo, we may add, descends a strong line of desperate and defeated men.

With the chapter on Pierre Biard in Maine there comes to the fore the work of the Jesuit Fathers, a determining factor in the history of this continent that all readers should know much more about than they do. Father Biard was exploring Maine in 1611 for France against England, of course, but with an interest in the Indians themselves that hardly an Englishman to that time possessed. How far Biard and his kind might have carried throughout New England this French conquest of the Indian by the Cross had they met no other rivals than England's fishermen, traders, and adventurers is a most absorbing speculation which Dr. Howe might have made. But these missionaries from God had to reckon with other Englishmen than mere seekers of commercial profits and excitement. They came finally against such as the Pilgrims in Massachusetts and the men of Virginia who would settle upon the land and remain there. That is why, in the opinion of this reviewer, the laws, institutions, customs, ways of life, in short the civilization of North America today is preponderantly English, why there exist side by side, reaching from ocean to ocean, the United States of America and the British Dominion of Canada instead of a vast inland Empire of France pinning little English provinces to the Atlantic Seaboard. Argall's triumph of 1613 over Biard in Maine might have been fleeting had not Pilgrims and their successors come with wives, children, and household goods to settle down upon New England's soil and stay, regardless of all hardships and hazards, even death itself.

The voyage of Adriaen Block in 1614 uncovered Long Island and Connecticut in detail and joined the approaches from the south with the region made familiar by Gosnold. In one swift summer Captain John Smith charted the whole coast of New England from Penobscot Bay to Cape Cod and spent the next seventeen years to his death in 1631 urging the settlement of the land. Dr. Howe is certain that neither Pilgrims nor Puritans would have reached Massachusetts when they did had it not been for Smith and his *Description of New England* published in 1616. Thomas Dermer, too, spied out the coast once more in 1619, on the last voyage before the Pilgrims arrived, only to lose his life the following year at the hands of Epenow, savage defender of Martha's Vineyard. Even while this last of the adventurers, explorers, privateers was fighting his last battle with the natives, the Pilgrims were on their way across the Atlantic, unintentionally, perhaps, but nonetheless to New England to start its first permanent settlement and deprive Epenow and all his kind relentlessly of their ancestral domain.

That these Englishmen stumbled upon the site of Plymouth unaware of those who had long since come before them, that they benefited from an act of God, some plague which practically annihilated the natives who doubtless after the first amenities would have opposed them bitterly, are ironic facts of history. But as ironic too, and as incidental it would seem, is the fact that they were welcomed, at least not opposed, by Squanto, a native of Plymouth who had crossed the Atlantic some four times thanks to the English and still liked them as Epenow did not. The dominant historical fact in the colonization of New England, taking all else into account, remains the fact that the Pilgrims came with their own women and to stay.

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Contributions to American Anthropology and History. (Carnegie Institution of Washington, Volume VII, Numbers 35–39, Pub. 528. Washington, 1942.)

This is a collection of five important papers first issued separately in 1940–42, and reviewed separately below. Text is produced by one of the newer and presumably cheaper

processes, the result clear and attractive. Reproduction of drawings and photographs is of the same high standard as in previous volumes of the series.

No. 35 *Late Ceramic Horizons at Benque Viejo, British Honduras*, J. ERIC S. THOMPSON, pp. vi–35; 21 pp. of line drawings, 6 photographic plates (issued 1940). This report supplements Thompson's "Excavations of San Jose, British Honduras," rounding out his picture of Maya archaeology in the same general region. Digging was for ceramics but some architecture was uncovered. Both are well illustrated and reported. Results are correlated with those at neighboring sites and the ceramic sequences at San Jose in general were confirmed. A "house-mound" area was chosen for excavation. Nevertheless the architectural remains seem, to the reviewer, to correspond closely to what might be expected in a major ceremonial group.

No. 36 *Maya Arithmetic*, J. ERIC S. THOMPSON, pp. 39–62, 4 figs. (issued 1941). The juxtaposition of the first two papers emphasizes the broad point of view of the author. He has hinted before that there should be a return to the attempts of the early Mayanists, such as those of Cyrus Thomas, to reconstruct the intellectual processes of the Maya priests. Here he advances in this field in two directions. He sets up a workable specific method of solving postulated Maya arithmetical problems involving "Long-count" and "Calendar-round" types of Maya dates. He constructs a table of day-signs using an existing one in the ancient Maya *Dresden codex* as a model; and uses movable physical counters. Evidence for the later, in Maya and other American areas, is collected, and a theoretical Maya abacus or counting board is constructed.

The title seems too all-inclusive since only correlations of Long-count and Calendar-round cycles are considered, but this is a very minor criticism. I think a new departure is the use of the amounts of certain probable mistakes in Maya records as evidence for Maya use of the postulated method. This approach is surely a valuable one. But such mistakes are probably much better evidence that certain problems were solved by the Maya than of a precise series of arithmetical steps chosen to accomplish the solution. By way of experiment I have found it possible to solve Thompson's problems by simpler methods probably available to the Maya, and they also would make his particular Maya mistakes especially likely.

The paper will not be easy of comprehension for readers not already grounded in the simple mechanics of the Long and Calendar-round dating systems, knowledge of which is largely assumed; but this knowledge is easily acquired from cited sources. Even with such knowledge the reviewer found it necessary to pore over the text and re-state some of it before fully understanding just what were the supposed problems to be solved. I think a tendency to let a vital sentence or two stand without elaboration of its implications is present in this and in other epigraphical papers of Thompson and others, and that it is to be regretted. This is the kind of research in which "amateurs" have frequently led "professionals," and therefore results should if possible be stated with an eye to both sorts of readers. Such presentation is admittedly easier to ask for than to produce.

Thompson seems to imply that he has fully revealed the purpose of a number of tables in the Dresden codex, and I think this may in time be successfully questioned. In general the method seeks to make the arithmetical operations simple and concrete, and easy without modern writing tools and quickly written numerical symbols. In some particulars the process is more complex than is necessary, notably the manner of finding the day-name corresponding to a Long-count number with the aid of a specially constructed day-sign table. But for other problems day-sign tables constructed and used on the same principles could be very advantageous. The paper should open up a new field of fruitful epigraphical inquiry, and non-professionals should not hesitate to enter it.

No. 37 *Substela Caches and Stela Foundations at Copan and Quirigua*, GUSTAV

STROMSVIK, pp. 63–96, 10 pp. of line drawings, 22 photographic plates (issued 1941). This is a detailed report on an important item in the complex of traits forming the Maya ceremonial centers or "cities." Objects recovered, including pottery, flint, and jade, as well as the foundation structures are objectively reported and illustrated. A surprising and presumably symbolic use of large drum-shaped stones as floor and roof-stones of cruciform sub-stela chambers is reported, with many other interesting details. Data on stela foundations and caches, so far as available at other sites, is listed.

In the discussion the results of Stromsvik's own work on the stelae is used to question Morley's dictum that Quirigua adopted the stela trait under the stimulus of leaders from Copan. It is quite evident that with similar full reports on stela foundations and caches from many sites, important comparative studies can be made. This paper is an important by-product of the work of consolidation and repair which the Carnegie Institution has been carrying on in cooperation with the governments of Honduras and Guatemala.

No. 38 *The Maya Calendar of the Ixil of Guatemala*, J. STEWARD LINCOLN, pp. 97–128, with sketch-map (issued 1942). The Ixil are a modern group of Maya-speaking Indians. The author died while in the field and the paper was arranged for press by J. Eric S. Thompson who writes me that most of the language of the text is necessarily his. The reported facts indicate that ethnological inquiries among surviving Maya tribes can be brought to bear on unsolved problems posed by the Pre-Columbian Maya calendar system, and to a degree not hitherto suspected. In this respect it might properly be bracketed with a paper by R. P. C. Schultz, who finds not only the ancient 20-day months surviving in Chiapas, but a lunar count as well (*El Mexico Antiguo*, Tomo VI, Num. 1–3, Mexico, 1942).

Lincoln extends the area in the Guatemala highlands where the 18 20-day months, plus the necessary extra 5-day-period, survive as year divisions. His findings indicate that it is here on the point of disappearance. The old cycle of 20 named days still permutes with the 365-day year to form the year-bearer cycle of 4 years, and the cycle of 13 numbered days is still known. The two day-cycles or "weeks" are recognized as forming a permutation, or at least as coinciding at 260 days. But each is in charge of different priests. This certainly suggests that the 20 and 13-day periods have their own reasons for existence, and that the 260-day *tzolkin* (Mexican *tonalamatl* or *tonalpohualli*) was formed of these cycles, and that they are not mere subdivisions of a pre-existent 260-day period.

Three priests at a single village insisted that there should be only 12 months, plus a 5-day period, and we are provided with a correlation of this unexpected native year with Christian dates, which are also used to keep track of Christian feasts. If one counts from the equivalent Christian dates he will find that the 2nd to 11th native months, inclusive, are each 30 days long. Four days seem to have been taken from the first and added to the 12th month, since these are respectively 26 and 34 days long. This is a striking confirmation of the statement of Bishop Landa, who says the Yucatan Maya of conquest times had two kinds of months, one 20 and the other 30 days long. Here is a second illustration of how modern ethnology can help in the elucidation of the ancient calendar system.

Modern native words of calendrical import are given. The pagan calendar system is brought to life with many details of the ceremonial affairs which it governs. Manipulation of beans, presumably as physical counters, is mentioned. Evidently the loss of writing did not interfere with the basic calendrical operations in the least, and there is no telling what remains to be learned. The loss of one of the very few who have in recent years begun to cultivate this neglected field is a grievous one.

No. 39 *Rio Grande Glaze Paint Ware*, ANNA O. SHEPARD, with an Introduction by A. V. Kidder, and 5 appendices, pp. iv, 131–262, 27 drawings, maps and charts (issued 1942). The reviewer is not competent to report on this paper except in the most general way. Quoting Dr. Kidder's introduction: " . . . Miss Shepard's paper is not only a valuable contribution to Rio Grande Prehistory but an exposition, by what might be called the case system, of the role of ceramic technology in archaeological research. It was, indeed, put in its present shape for that express purpose. It therefore contains sections devoted to discussion of the interrelation of the two disciplines. I recommend their most careful reading."

I think the author's main message to archaeologists can be summarized as follows. The archaeologist should understand the possibilities and also the limitations of the technological approach; and the technologist should understand the range of archaeological problems which should be solved if possible. The number of sherds submitted should be large enough to form a true sample; and in order to form such a sample, they should be selected at random and should not be "representative collections." They should be in good condition, so that the archaeologist's criteria of shape and decoration can be correlated with the technological findings respecting the materials of which they were made. Quick optical methods of examination are useful but will be misleading if used by one who cannot also check his identifications by more exact methods.

One can conclude that neither technologist nor archaeologist should attempt to practice the other's technique, but should work in closest collaboration in the matter of problems attacked. To attain optimum collaboration of this sort it is necessary that the archaeologist have a general understanding of the techniques to be applied to paste and paints, even though he will not use them. The paper, with its appendices, is designed to give this to him.

LINTON SATTERTHWAITE, JR.
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SOCIETY FOR AMERICAN ARCHAEOLOGY
ANNUAL MEETING—1943

At the last annual meeting of the Society for American Archaeology, held in Cincinnati, Ohio, May 8 and 9, 1942, no decision was reached as to the time and place for the 1943 meeting. In line with the request of the Coordinator of Transportation that scientific societies not directly concerned with the war forego their usual meetings, it was tentatively decided to hold this year a small business meeting only, for election of officers and presentation of annual reports.

Owing to the Secretary's absence from this country for over four months early in the year, action toward such a meeting was not begun until June. On June 17, 1943, the Council members were circularized for approval of a skeleton meeting to be held in New York in mid-July. Eleven members replied: one expressed neither approval nor disapproval; the others approved the proposed time and place, with only two indicating any intention of attending. It thus became evident that no meeting of the Council could be held, and there was considerable doubt that even the officers could assemble in the foreseeable future. Under these adverse conditions, the advisability of foregoing even the proposed skeleton business meeting presented itself.

The provisions of Article IV, Sections 4 and 5, of the revised Constitution, as published in AMERICAN ANTIQUITY, October, 1942, pp. 206–208, empower the Executive Committee "... to take in the Society's name and behalf any action that the Society as a whole could take, but all its acts shall be reported to the Society at the next annual meeting." Also, the President is authorized to "... ask the Executive Committee to vote on specific questions by mail, and if a majority should vote by mail for or against any measure thus submitted, that vote shall be as decisive as if a meeting had been held."

After a lengthy and voluminous correspondence with the President, Treasurer, and Editor, the Secretary, acting at the President's request, circularized the members of the Executive Committee with regard to the various business measures that would normally be taken up at the Society's annual meeting. These matters specifically included the following:

1) The amendment of Article III, Section 5, to read:
The annual dues of Active Members shall be four dollars.

2) Acceptance of the Treasurer's report, together with the statement of the Auditing Committee, and the budget for the coming year.

3) Election of the following slate of officers for 1943, as presented by the Nominating Committee (Dr. George C. Vaillant, chairman) in a letter to the Secretary dated Jan. 28, 1943:

President	Emil W. Haury
Vice-presidents	Wm. Duncan Strong
	Luis Valcarcel
Secretary	Waldo R. Wedel
Treasurer	Frederick Johnson
Editor	Douglas S. Byers
Councillors	J. Otis Brew
	J. Eric Thompson

4) Acceptance of the Editor's report.

5) Acceptance of the Secretary's report.

The vote of each member of the Executive Committee on each of the above 5 measures is recorded over the member's signature in the Secretary's files. The action taken by the 7 Committee members is summarized in the following table:

Measure	*Approved*	*Disapproved*	*No vote*
1	6	1	0
2	7	0	0
3	7	0	0
4	7	0	0
5	7	0	0

By a majority vote of the Executive Committee, therefore, the business measures presented have been approved, subject to whatever action is taken on this vote at the next annual meeting of the Society.

Respectfully submitted,
WALDO R. WEDEL, *Secretary*

July 31, 1943.

REPORT OF SECRETARY

During the past year, 1942–43, the President appointed the following committees as provided by the Constitution:

Budget Committee: N. C. Nelson, Waldo R. Wedel, Frederick Johnson, Douglas S. Byers, Glenn A. Black, Harold S. Colton, Charles R. Keyes, and Cornelius Osgood.

Auditing Committee: J. O. Brew (chairman), Leaman F. Hallett, and Lauriston Ward.
Nominating Committee: George C. Vaillant (chairman), F. H. H. Roberts, Jr., and Wendell C. Bennett.
Program Committee: Frank M. Setzler (chairman), Waldo R. Wedel, and Henry B. Collins.

The names of these committee members were published in the Society's journal for January, 1943, p. 301.

Owing to travel difficulties and other wartime restrictions no special, joint, or regional meetings of the Society were authorized by the Executive Committee during the year.

Following the recommendations of the resigning Secretary-Treasurer, and in accord with provisions of the revised Constitution adopted in May, 1942, the duties of Secretary and Treasurer of the Society were separated and two offices created. Much of the Secretary's time since has been given over to a reorganization of correspondence files and business records, and the elimination of useless circulars and other matter. There still remains a rather considerable mass of material whose permanent preservation hardly seems worth while in view of its bulk and the costs of shipping from place to place as the office of Secretary changes hands.

Approximately 100 invitations to membership in the Society were sent out from the Secretary's office to persons whose names were submitted by active members; less than half of these resulted in the addition of new members.

Respectfully submitted,
WALDO R. WEDEL

REPORT OF TREASURER, APRIL 30, 1943

MEMBERSHIP

	May 9, 1942	Inactive and unidentifiable a/c from old records—dropped	Resigned	Deceased	Dropped for non-payment of 1942–43 dues	New members added	May , 1943
Benefactors and Honorary Members	none						none
Life Members	11						11
Institutional Members	124		2		-	3	125*
Active Members	841	37*	23	6	74	44	735*

* Due to irregularities in the former membership lists and a reorganization of the accounting system these figures are approximate. They cannot be used to determine income from dues during 1942–43. On May 1, 1943 a control account was set up so that eventually these figures will be corrected.

PERMANENT FUND

Gross Receipts		
Transferred from Working Fund	$580.52	
Interest Sept. 19, 1942	.97	
Interest April 15, 1943	5.81	
Balance Forward	$587.30	

WORKING FUND

Gross Receipts

Brought Forward from 1941–42		$ 818.65
Dues and Subscriptions		
Prior to 1940	$ 6.00	
Fiscal year 1941–42	30.00	
Fiscal year 1942–43	2,141.40	
Prepaid 1943 & after	66.00	
		2,243.40
Contributions to Working Fund		
Miscellaneous Gifts	$ 778.50	
Viking Fund Grant	500.00	
		1,278.50

Sale of AMERICAN ANTIQUITY			
Single numbers	$ 21.75		
Volumes	123.00		
		144.75	
Sale of Notebook		.25	
Reimbursements for Reprints		260.45	
Reimbursements for Illustrations		108.62	
Subsidy for Articles Published		36.13	
Sale of Junked Cuts		2.50	
Advance for Dues, Illustrations, Reprints		49.57	
			$4,942.82
Gross Disbursements			
Publishing AMERICAN ANTIQUITY			
Vol. VII, No. 40 Vol. VIII, Nos. 1, 2, 3			
Printing	$1,717.93		
Illustrations	599.34		
Distribution	91.65		
Reprints	257.06		
Cuts Purchased in Advance	24.57	$2,690.55	
Editor's Account			
Assistant	$ 200.00		
Secretary	65.00		
Stationery	12.25		
Postage & Telephone	18.64		
Miscellaneous Supplies	9.44	305.33	
Treasurer's Account			
Secretary	$ 65.00		
Postage & Telephone	20.90		
Express	22.04		
Printing Bills, Cards, etc.	63.66		
Supplies for Accounting	74.30		
Bank & Collection Charges	8.55		
Mimeographing	1.00	255.45	
Miscellaneous			
Notebook			
Mimeographing & Distrib.	$ 82.55		
Postage for Committees, etc.	2.26		
Secretary's Account			
Postage $36.60			
Mimeographing 3.29			
	$ 39.89		
Stationery, Blanks, etc.	38.00		
Refund, Overpayment Reprint	.63	163.33	
Transferred to Permanent Fund		580.52	
			$3,995.18
Cash on Hand, April 30, 1943			$ 947.64
Accounts Receivable			250.74
			$1,198.38
Accounts Payable			
Publishing AMERICAN ANTIQUITY, Vol. VIII, No. 4 (Estimate)			650.00
Balance Forward			$ 548.38

Resources

Working Fund, Cash on Hand April 30, 1943	$ 947.64	
Permanent Fund	587.30	
Accounts Receivable	250.74	
		$1,785.68

Liabilities

Dues paid in advance	$ 66.00	
Advances for Dues, illustrations, reprints	49.57	
Free Cash	182.07	
Accounts Receivable	250.74	
Estimated cost of Vol. VIII, No. 4	650.00	
Permanent Fund	587.30	
		$1,785.68

Approved by Auditing Committee
(signed) J. O. BREW, *Chairman*
L. F. HALLETT
LAURISTON WARD

Budget 1943–44

Estimate of Income				
Estimated Balance Forward				$ 451.50
Estimated Income from Members				
Present Paying Membership	888			
Estimated Loss	50			
Total Estimated Membership 838 at $3.00 per year				$2,514.00
Contributions from Members				200.00
Total Estimated Income				$3,165.50
Estimated Expenses				
Publishing AMERICAN ANTIQUITY				
4 issues at $605.00 net			$2,420.00	
Editor's Account				
Assistant ($50.00 per quarter)		$ 200.00		
Secretary ($5.00 per month)		60.00		
Postage, Telephone, Supplies		40.00		
			300.00	
Treasurer's Account				
Secretary ($10.00 per month)		$ 120.00		
Bank & Collecting Charges		10.00		
Printing & Mimeographing		55.00		
Postage, Telephone, Supplies		40.00		
			225.00	
Miscellaneous Expenses				
Secretary's Office				
Postage	$35.00			
Mimeographing	5.00			
Stationery	20.00			
		$ 60.00		
President's Office				
Postage	$ 5.00			
Stationery	10.00			
		15.00		
Incidentals		40.50		
			$ 115.50	
Reserve for Contingencies			105.00	
Total Estimated Expenses				$3,165.50

EDITOR'S REPORT

Volume VIII of AMERICAN ANTIQUITY included 418 pages, slightly less than the preceding Volume VII. This volume was partly subsidized by authors and the large number of illustrations in Number 3 of the volume were made possible entirely by authors' subsidy.

Late in the spring of 1942 a new contract was signed with the George Banta Publishing Company bringing the Company's charges into line with increased costs.

A WPB order which went into effect with the completion of Volume VIII limits journals using less than one hundred tons of paper per year to a paper consumption during the calendar year of 1943 equal to that used during the calendar year of 1942. With the completion of Volume VIII we have used somewhat more than half of our paper consumption during 1942. The July issue is already made up as a large issue and this will probably mean that the October issue will be limited, principally because of the WPB order.

A second WPB order, *L*-291, effective May 25 forbade the use of stitching wire in pamphlets containing twelve pages or less, including covers. Authors who had ordered reprints from the April number were notified of this order and they immediately gave their approval for the completion of their reprint orders without stitching wire. Before the reprints could be made up the order was revoked and reprints were completed with one wire stitch.

These incidents are illustrative of the difficulties which the Society must face in continuing to publish its journal. We shall be dependent as much on government orders as on our own exchequer and on the supply of manuscripts.

Because a number of our members active in fields of research wish to see preliminary reports of their activities prepared for publication before their entry into the Armed Forces, the Editor has received a large number of manuscripts during the past year. These will be published as opportunity offers.

The policy of preparing numbers relating to one field has been carried through Volume VIII, the Southwestern number appeared in July, 1942, and the Early Man number in January, 1943. The April number was not designed as a special number but contained by chance four articles concerned with the northern and eastern parts of North America.

The combined bibliographies accompanying these numbers which have been prepared from the separate bibliographies by Miss Marian Smith should be of considerable value.

Although the July, 1943 issue, Volume IX, No. 1, has been drawn up to include articles dealing with countries south of the Rio Grande, no further special numbers are contempleted since the files now contain articles of scattered interest which do not lend themselves to combination.

No issues of the Notebook appeared during the past fiscal year.

Notes and News have not been solicited during the past year. The occasional notes which have been submitted have been published at the earliest possible date. Such notes will continue to receive attention as they are submitted.

Respectfully submitted,
DOUGLAS S. BYERS

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INFORMATION FOR AUTHORS

AMERICAN ANTIQUITY is concerned primarily with archaeological matter, but articles dealing with related fields may be accepted providing that their connection with the archaeological field is clear. Manuscripts must be typewritten on standard 8½×11 paper, on one side only, double spaced. Articles should not exceed a length of 7500 words without subsidy by the author.

Bibliographies must follow a standard form; citations from journals should be given as follows:

JENKS, ALBERT E. AND LLOYD A. WILFORD.
1938. "The Sauk Valley Skeleton." *Bulletin of the Texas Archeological and Paleontological Society*, Vol. 10;

citations of separate books or reports:

JENKS, ALBERT E.
1936. *Pleistocene Man in Minnesota.* University of Minnesota Press.

Illustrations over and above one page of half tones or the equivalent in line cuts must be paid for by the author. Photographs for reproduction should be on glossy paper, unmounted, and of a size suitable for reduction to 4½×7 inches, or a portion thereof, making due allowance for captions. Line drawings should be in India ink on a smooth, hard-surfaced paper, with figure numbers written lightly in pencil on the margin or back.

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25 copies	$2.00	$3.65	$ 5.65	$ 5.75	$ 7.65	$ 8.65	$ 9.90	$10.50
50 "	2.50	4.00	6.25	6.50	8.50	9.75	11.25	12.00
75 "	2.75	4.40	6.90	7.25	9.40	10.90	12.65	13.50
125 "	3.25	5.15	8.15	8.75	11.15	13.15	15.40	16.50
175 "	3.75	5.90	9.40	10.25	12.90	15.40	18.15	19.50
275 "	4.75	7.40	11.90	13.25	16.40	19.90	23.65	25.50

Covers with title and date of issue of AMERICAN ANTIQUITY will be furnished at the following rates: 25 for $2.25; additional covers 1½ cents each. Plates will be furnished at 100 inserts for $1.00.

Cost of transportation of the reprints (postage or express) will be charged to the author.